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NYASALAND PROTECTORATE.

ANNUAL
MEDICAL & SANITARY
REPORT

For the year ending 31st December, 1935.

PRICE 4s.

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MEDICAL DEPARTMENT,
ZOMBA,
NYASALAND.

5th April, 1936.

SIR,

I have the honour to submit for the information of His Excellency the Governor and for transmission to the Right Honourable the Secretary of State for the Colonies, the Medical Report on the Health and Sanitary conditions of Nyasaland for the year 1935, together with the Returns etc., appended thereto.

I have the honour to be,
Sir,
Your obedient servant,
A. D. J. BEDWARD WILLIAMS,
Director of Medical Services.

The Hon. The Chief Secretary to the Government,
Zomba.

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SECTION I. ADMINISTRATION.

A. STAFF.

The staff sanctioned for the year 1935 was :—

(a) European.

Director of Medical Services.
Senior Health Officer.
Senior Medical Officer.
Medical Entomologist.
14 Medical Officers.
Pathologist.
Matron.
10 Nursing Sisters.
2 Sanitary Superintendents.
Clerk and Medical Storekeeper.
Junior Clerk.

(b) Asiatic.

10 Sub-Assistant Surgeons (provision for nine and one temporary relief).

(c) African.

12 Clerks.
1 Laboratory Assistant.
12 Hospital Assistants.
182 Dispensers and Probationers.
16 Sanitary Inspectors.
40 Vaccinators.
19 Medical Store Assistants, Packers, etc.
5 Messengers.

A varying number of Hospital and Dispensary attendants and Sanitary Labourers averaging 264. Principal appointments, promotions, changes, etc., made during the year :—

Appointments.

	Date
Mr. C. K. Joshi, Civil Sub-Assistant Surgeon	15- 3-1935.
Miss R. P. Harrison, Nursing Sister	22-11-1935.
Mr. Hudson B. Chamba, African Clerk, First Grade	1- 4-1935.
Mr. E. E. Mothello, ,, ,, ,, ,, ...	1- 6-1935.

Acting Appointments.

Dr. H. H. B. Follit, Senior Health Officer, Acting Director of Medical Services from	24-3-1935 to 7-12-1935.
Mr. A. C. Stewart, Marine Accountant and Transport Officer, Acting Clerk and Medical Storekeeper from ...	10-3-1935 to 2-12-1935.

Transfers.

Nil.

Secondment for Duty.

Dr. D. P. Turner, Medical Officer, seconded for duty with the Medical Department, Somaliland Protectorate, from 1-10-1935 to the end of year.

Retirements.

Mr. Lawrence M'manga, African Clerk, First Grade, retired from the service on 1-6-1935, on completion of 31 years service.

Mr. Leonard Mphamba, Hospital Assistant, retired from the service on 19-10-1935 through ill-health.

Mr. Austin Maosa, African Clerk, First Grade, retired from the service on 31-12-1935 on account of age.

Resignations.

	Date
Dr. P. P. Martyn, Medical Officer, with effect from	1-6-1935.
Miss F. McQuire, Nursing Sister, with effect from	14-9-1935.

Termination of Appointment.

Jemadar Ram Lall Datta Abdali, Sub-Assistant Surgeon, reverted to military duty with the Indian Medical Department on ... 3-8-1935.

Jemadar Dalip Singh, Sub Assistant Surgeon, reverted to military duty with the Indian Medical Department on ... ... 25-12-1935.

Deaths.

Mr. Tom D. Duncan, African Senior Hospital Assistant, died at Dowa on 17th April, 1935 as a result of an accident.

B. LIST OF ORDINANCES, ETC., ENACTED DURING 1935 AFFECTING PUBLIC HEALTH

1935	PROCLAMATIONS.
22nd March ...	No. 4—Townships Ordinance. Cap. 21: Salima Township.
22nd ,, ...	No. 5—Townships Ordinance. Cap. 21: Chipoka Township.
8th April ...	No. 8—Townships Ordinance. Cap. 21: Balakas Township.
21st May ...	No. 13—Townships Ordinance. Cap. 21: Salima Township.
21st ,, ...	No. 14—Townships Ordinance. Cap. 21: Balakas Township.
21st ,, ...	No. 15—Townships Ordinance. Cap. 21: Chipoka Township.
14th October ...	No. 28—Townships Ordinance. Cap. 21: Port Herald Township abolished.
26th November ...	No. 31—Townships Ordinance. Cap. 21: Balakas Township declared.
6th December ...	No. 32—Townships Ordinance. Cap. 21: Chipoka Township declared.
6th ,, ...	No. 33—Townships Ordinance. Cap. 21: Salima Township declared.

1934. ...	RULES, ORDERS AND NOTICES.
29th December ...	Sanitary Boards Ordinance, 1929: An appointment to Fort Manning Sanitary Board.
1935.	
5th February ...	Sanitary Boards Ordinance, Cap. 20: Appointments to Dedza Sanitary Board.
20th March ...	Public Health Ordinance. Cap. 73: Blackwater Fever declared a Notifiable Disease.
13th June ...	Sanitary Boards Ordinance. Cap. 20: Namadzi Trading Centre Sanitary Board constituted.
13th ,, ...	Sanitary Boards Ordinance. Cap. 20: Songani Trading Centre Sanitary Board constituted.
4th July ...	Sanitary Boards Ordinance. Cap. 20: Dowa Sanitary Board constituted.
2nd August ...	Public Health Ordinance. Cap. 73: Authorisation of Cemetery at Limbe.
6th ,, ...	Townships Ordinance. Cap. 21: Port Herald Bye-Laws.
27th ,, ...	Sanitary Boards Ordinance. Cap. 20: Sanitary Boards Rules applied to Dowa, Namadzi, and Songani.
26th September ...	Sanitary Boards Ordinance. Cap. 20: Cholo Sanitary Board constituted.
26th ,, ...	Sanitary Boards Ordinance. Cap. 20: Rules applied to Cholo Sanitary Area.
10th October ...	Medical Practitioners and Dentists Ordinance. Cap. 84: Hospital Assistants (Examination) Rules, 1935.
14th ,, ...	Sanitary Boards Ordinance. Cap. 20: Port Herald Sanitary Board constituted.
14th ,, ...	Sanitary Boards Ordinance. Cap. 20: Rules applied to Port Herald Sanitary Area.
14th November ...	Townships Ordinance. Cap. 21: Fort Johnston Bye-Law, 1935.
14th ,, ...	Townships Ordinance. Cap. 21: Zomba Township (Amendment) Bye-Laws, 1935.
2nd December ...	Public Health Ordinance. Cap. 73: Measles declared a Notifiable Disease.

C. FINANCIAL.

The total expenditure for 1935 was £47,128 17s. 10d. a *decrease* of £2,009 6s. 5d. on the expenditure for 1934.

The approved expenditure for the Department for 1935 was £50,369.

As criticism is often directed on expenditure on health services it is instructive and interesting to compare, as far as possible, the expenditure in respect of Nyasaland with other neighbouring territories such as Tanganyika, Uganda, Kenya, etc., the following table sets out the position for the year 1933.

	Population (African)	Medical expenditure (Annual Medical Report)	Total Expenditure (Report on African Affairs)	Proportion of Medical expenditure to total expenditure	Total Expenditure per head		Medical expenditure per head
		£	£		s.	d.	
Uganda ...	3,604,130	144,156	1,275,590	1/8th approx.	7	0	9.5 pence.
Tanganyika ...	5,000,160	190,700	2,300,000	1/12th approx.	9	0	9.1 pence.
Zanzibar ...	235,113 *	49,300	449,100	1/9th to 1/10th	36	0	50 pence.
Kenya ...	2,967,000	199,570	3,168,000	1/15th to 1/16th	21	0	15.8 pence.
Nyasaland ...	1,608,000	45,398	528,361	1/11th to 1/12th	6	6	6.7 pence.
N. Rhodesia ...	1,371,200	63,000	778,879	1/12th to 1/13th	11	4	11 pence.

* Population includes Arabs and Asiatics.

The total revenue of the Department was £1,391 12s. 11d., the amount was made up as follows:—

	£	s.	d.
(*a*) Hospital fees	990	19	6
(*b*) Sale of drugs, etc.	400	13	5

From the unallocated stores, 4,893 bottles of 100 tablets each of bihydrochloride of quinine and 185 packets of quinine sulphate were sold to the general public, the amount realised being £893 11s. In 1934 the amount realised from the sale of quinine was £1,009 2s. 10d.

During the year under review the sale price of quinine was reduced from 4/- to 3/9 per bottle.

The actual details of the expenditure of the Medical Department for 1935 are as follows:—

	£	s.	d.
Approved expenditure, 1935	50,369	0	0
Actual expenditure, 1935:—			
(*a*) Personal emoluments	32,373	5	1
(*b*) Other charges	14,755	12	9
Total ...	£47,128	17	10

SECTION II.—PUBLIC HEALTH.

A. GENERAL REMARKS.

During the year the Sanitation Department was merged into the Medical Department, this merger strengthened the administration of the Department and has undoubtedly resulted in increased efficiency and more economical working.

Owing to the resignation of Dr. P. P. Martyn, the Department was short of one medical officer for the greater part of the year.

The Director of Medical Services proceeded on leave towards the end of March and Dr. H. H. B. Follit assumed the somewhat thankless and onerous appointment of Acting Director until the first week in December.

Dr. T. A. Austin, Medical Officer, assisted at Medical Headquarters.

Two medical officers distinguished themselves while on leave and rendered themselves more valuable to the service by the acquisition of the degrees of F.R.C.S. (Edin.) and F.R.F.P. and S. (Glasg.) respectively.

The Director attended two medical conferences during the year, the first, the Pan-African Health Conference at Johannesburg in November and the second, a Conference between the Directors of Medical Services of Northern and Southern Rhodesia and Nyasaland at Salisbury in December.

Much benefit should ultimately accrue as a result of these inter-territorial meetings and discussions and much valuable information is conveyed by personal contact; opportunities occur during these conferences for the demonstration of public health measures and for visits to hospitals and institutions which are of great practical and scientific interest.

Considerable re-organisation has taken place in the Medical Department during the last two years, and an endeavour has been made to emphasize in a practical manner the public health side of the Department and, to give, if anything, a bias to the preventive side of medicine without detriment to the curative side.

The rural dispensary system, the African analogy to the primary health centres of Europe, has been developed by more frequent supervision, by raising the standard of knowledge of the native dispensers and enlarging the scope of their work by requiring them to visit and to sanitate, as far as possible, the villages in the vicinity of their dispensaries. Medical officers have been encouraged to visit their districts and to get into close contact with the native population.

In order that the personnel of the Department may understand and appreciate the aim and objects of the health services a departmental policy has been formulated, based to a large extent on the principles enunciated in the "Memorandum of Native Policy in East Africa," particular emphasis being laid upon the importance of securing full inter-departmental co-operation in all measures undertaken for the promotion of public health amongst the general population.

The investigations which were commenced in the previous year into the conditions of rural life were continued and much useful information was collected, a short account of this work is given in the appropriate section of this report under the heading 'Medical Surveys,' and it will be evident after perusal of this section that the work performed during these 'Medical Surveys' forms a valuable contribution to the progress made in rural sanitation and village improvement.

Medical inspections were carried out at selected native schools and at the two European schools.

Visits were made to some of the estates employing labour and the feeding, housing and medical arrangements were examined.

A step of primary importance in assisting Government to correlate and to carry out its native policy was taken by Government in forming a Committee, styled the "Native Welfare Committee" consisting of the following five members:—

The Senior Provincial Commissioner.
The Director of Medical Services.
The Director of Agriculture.
The Director of Education.
The Conservator of Forests.

The function of this committee is to co-ordinate native welfare and to advise the Governor as to the steps which should be taken in the direction of such co-ordination.

Finally, it is most gratifying for the Director to be able to express in the Report his great appreciation of the loyal and diligent manner in which all ranks of the Department have applied themselves to the work of re-organization which has been taking place during the last two years. He ventures to state that it would be difficult to find a keener or more efficient service in any part of the Colonial Empire.

The general interest in health matters displayed by the Administration has also been much appreciated and any progress that has been achieved has been assisted considerably by their co-operation.

Medical assistance to Non-official Bodies.

Financial assistance to the extent of £900 was afforded to Missions undertaking the treatment of lepers. The grant to the Mission Hospital at Blantyre was increased to £315 a year in order to cover the cost of treatment to official and non-official native patients from this district recommended for admission to hospital by the Government Medical Officer. A small annual grant of £75 is also made for the ward reserved for Asiatics at the above mentioned hospital.

Drugs and dressings were sold at Government cost price to *bona fide* employers of labour and to missions performing medical work.

Free issues of drugs to the value of £30 were made to non-official medical institutions undertaking the treatment of leprosy and hookworm.

Returns for the year.

The number of in and out-patients treated during the year is compared with the numbers treated for previous years in the following table:—

	1932	1933	1934	1935
Europeans:				
In-patients	189	178	188	186
Out-patients	1,079	1,217	1,308	1,693
Africans and Others:				
In-patients	6,325	7,322	9,044	10,052
Out-patients	308,862	353,344	375,852	436,906[*]

---

[*] NOTE. This figure represents the sum total of African in and out-patients. The total number of African patients treated shows a gratifying increase as no additional staff or accommodation was provided during the year.

INCIDENCE OF DISEASES ACCORDING TO GROUPS.

		Hospitals		Rural Dispensaries.	
1.	Epidemic, Endemic and Infectious Diseases	11,300		20,928	
2.	General Diseases not mentioned above ...	1,037		403	
3.	Affections of Nervous System and Organs of the Senses	9,378		27,544	
	Eyes		6,363		19,161
	Ears		2,446		7,853
4.	Affections of the Circulatory System ...	334		33	
5.	Affections of the Respiratory System ...	14,331		43,441	
6.	Diseases of the Digestive System ...	24,017		56,512	
	Ankylostomiasis		3,938		3,788
	Constipation		10,017		25,282
7.	Diseases of the Genito-urinary System (non-venereal)	4,304		3,649	
8.	Puerperal State	181		26	
9.	Affections of the Skin and Cellular Tissues	36,031		89,082	
	Ulcers		7,848		36,006
	Scabies		19,468		51,912
10.	Diseases of Bones and Organs of Locomotion	3,722		13,319	
11.	Malformations	11		—	
12.	Diseases of Early Infancy	19		—	
13.	Affections of Old Age	230		—	
14.	Affections produced by External Causes ...	15,542		49,752	
15.	Ill-defined Diseases	2,648		10,775	
	Total ...	123,135		315,464	

The following diagrams I—IV. show the incidence of the epidemic, endemic and infectious diseases, the proportions of these diseases treated at hospitals and the proportion of in-patient deaths amongst the diseases in Group I. and in all groups of diseases.

DIAGRAM I.

Showing the proportion of infectious, systemic and other diseases treated at Government hospitals (excluding rural dispensaries).

Total incidence, 123,135.

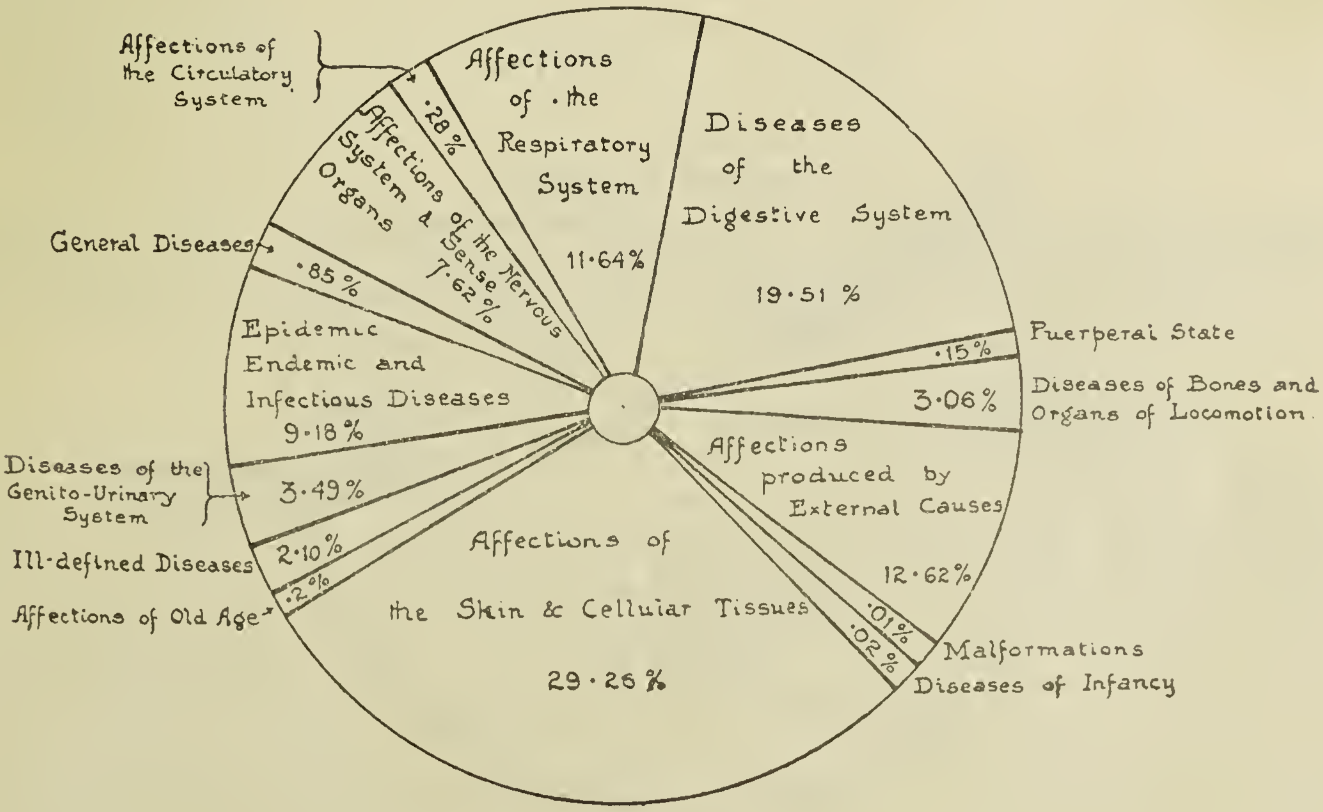


DIAGRAM II.

Showing the proportion of in-patient deaths amongst the groups of diseases. Total in-patient deaths 264 (2.59 per cent. of all in-patients).

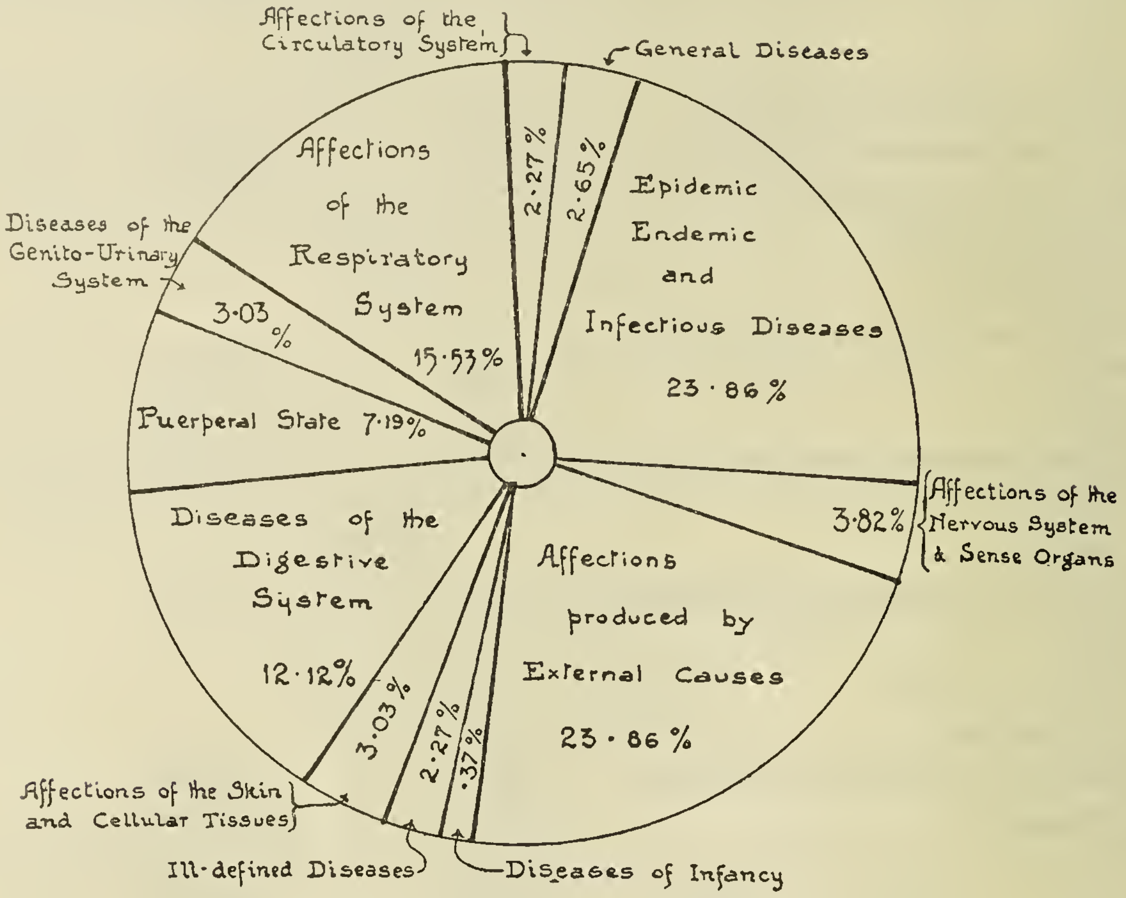


DIAGRAM III.

Showing the proportion of the diseases in Group I. treated at Government hospitals (excluding rural dispensaries). Total incidence of epidemic, endemic and infectious diseases, 11,300.

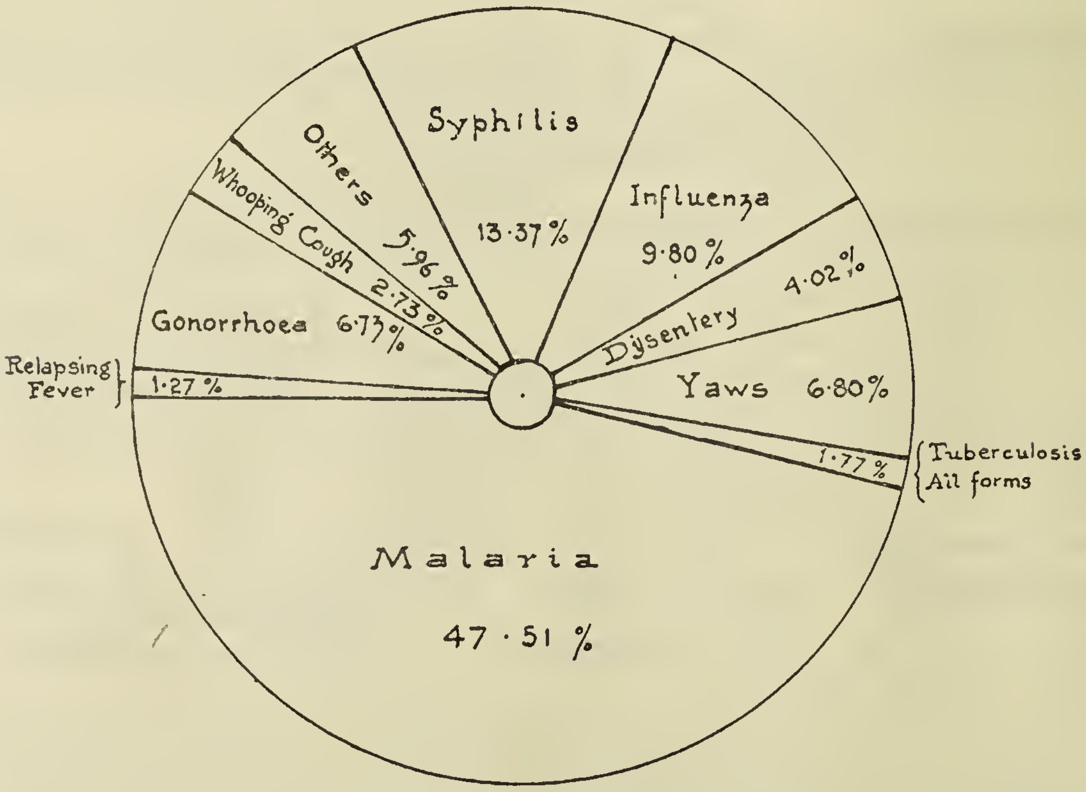
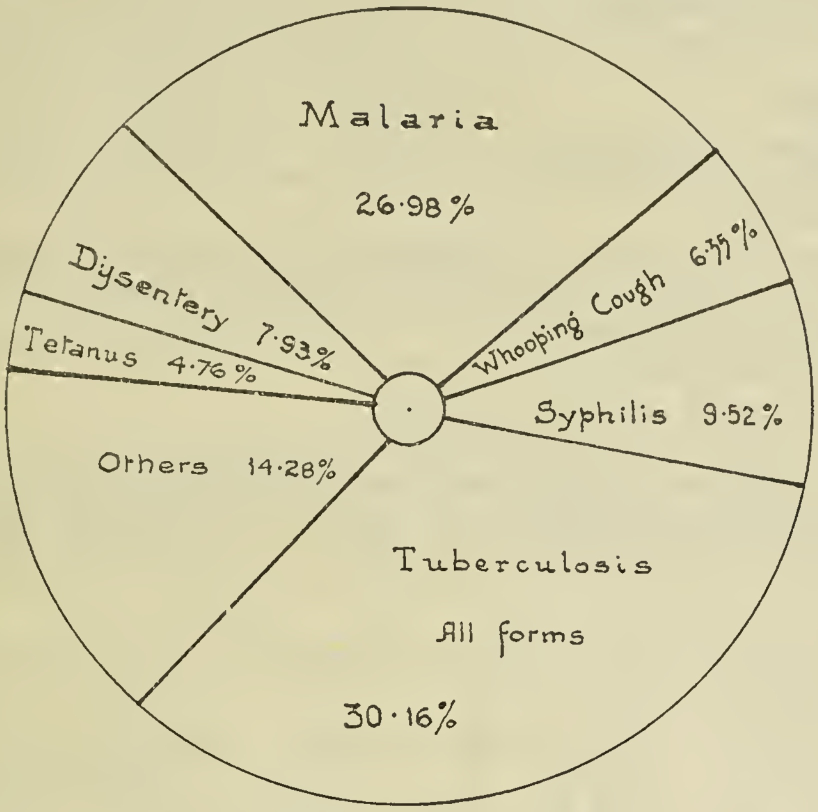


Diagram IV.

Showing the proportion of deaths from diseases in Group I. occuring at Government hospitals Total in-patient deaths due to epidemic, endemic and infectious diseases, 63.



B. GENERAL DISEASES.

Malignant Disease and Tumours.

The total number of cases of malignant disease reported for the year was 31 as compared with 26 cases in 1934, 18 cases in 1933 and 30 cases in 1932.

During the year 40 specimens of tissues for examination were sent to the Laboratory, the following tumours were differentiated:—

Papillomata	1.
Carcinoma	3 (bladder, cervix and breast).
Sarcomata	1 (jaw).
Fibromata	3.
Myxomata	2 (parotid and thigh).
Mixed cell tumour	1 (jaw).
Chondroma	1 (radius).
Lymphadenoma	1.
Filariasis of testicles	2.
Filarial labium major	1.
Juxta-articular nodes	2.
Blastomycosis	1 (jaw).
Schistosomiasis	4.
Normal tissues	17.
Syphilis of brain	1.
Cysticercus in brain	1.
Ainhum	2.

Deficiency Diseases.

Comparatively few cases of actual deficiency disease are seen in Nyasaland although it is considered that a very wide 'state of pre-deficiency' occurs. During the year 53 cases were reported in hospital practice, the following types of avitaminosis were differentiated:—

Scurvy	16.
Beriberi	1.
Rickets	5.
Pellagra	31.

Fourteen cases of pellagra occurred in the prison at Zomba, the majority being relapses.

During the year an examination was made by Dr. E. J. Blackaby of the 376 inmates of the Central Prison, Zomba for signs of avitaminosis A.

The following, which are the more salient features in lack of the anti-infective vitamin in adults, were investigated:—

(*a*) Eye infections, especially conjunctivitis due to xerophthalmia.

(*b*) Hemeralopia.

(*c*) Catarrh infections of the respiratory tract.

(*d*) Evidence of urinary calculus.

(*a*) *Eye infections.*

(i)	Dimness of vision—corneal opacities	3 cases.
(ii)	Active corneal ulcer	1 case.
(iii)	Perforating ulcer of cornea	1 case.
(iv)	Pterygium	1 case.
(v)	Optic atrophy	1 case.
(vi)	Night blindness and migraine	1 case.

(*b*) *Catarrhal infections.*

The following table covering a period of three years shows the comparison in the relative number of prisoners and general population at the African Hospital, Zomba, in terms of the percentage of the total patients, who were suffering from :—

(i) Conjunctival infections,

(ii) Respiratory catarrh including influenza.

Year	Central Prison Hospital					Zomba African Hospital				
	Total No. of patients.	No. with conjunctivitis	Percentage of total.	No. with respiratory catarrh.	Percentage of total.	Total No. of patients.	No. with conjunctivitis	Percentage of total.	No. with respiratory catarrh.	Percentage of total.
1932	2133	32	1.5	300	14	5545	188	3.4	1146	20.6
1933	2603	42	1.6	332	12.8	7203	285	4.0	860	11.9
1934	2449	44	1.8	352	14.4*	8378	295	3.5	1215	14.5

* Influenza epidemic.

The table seems to indicate that conjunctival infections are less than half as common in the prison as in the general population.

(*c*) *Urinary calculus.*

No cases of this condition were observed. The prison diet consisting of meat, cassava, leaves of pumpkins, cabbage, sweet potatoes, tomatoes, beans and rice appeared satisfactory.

Among the general population there is evidence that some degree of avitaminosis exists, as during the months January to April (relatively speaking the famine months) a large proportion of cases of conjunctivitis occur.

During 1934 some half dozen cases of conjunctivitis combined with sores at the mucocutaneous junction of the mouth were seen, they resembled the description of "Wright's disease" and were not associated with pellagra, they cleared up with cod liver oil and local treatment.

C. COMMUNICABLE DISEASES.

(a) Mosquito and insect-borne diseases.

Malaria and Blackwater Fever. The incidence of these diseases varied only slightly from that of last year, in the group of communicable diseases the incidence was 47.51% as compared with 42.25% in 1934, 42.82% for 1933.

The total number of cases reported from hospitals and rural dispensaries was 15,375 as compared with 14,044 in 1934.

The predominant species of malarial parasite was the *Plasmodium falciparum* and the least common, the *Plasmodium malariae.* Actual blood examinations of a total number of 1,350 cases, showed that 1,020 were due to the malignant tertian parasite, 249 to the benign tertian parasite and 81 to the quartan parasite.

Three cases of *P. ovale* were found by Professor Thomson by 'random sampling' of the blood of some 400 natives.

Five cases of blackwater fever were reported during the year as compared with 13 cases for 1934.

Three of the cases occurred amongst the native and two amongst the European population with two deaths and one death respectively.

Professor J. Gordon Thomson made a visit to Nyasaland in 1934, and published later in the year an exceedingly interesting paper on 'Malaria in Nyasaland'.* Some of the findings are particularly interesting and are quoted below :—

(i) The chief vectors were found to be *A. gambiae* and *A. funestus*, the former being the more important. During the rains malaria increases and so does *A. gambiae*.

(ii) Some young children exhibited a tolerance and this tolerance increases as the children grow older; many infants die; 10% only live to 6 years.

(iii) No cases of congenital infection were seen.

(iv) *P. vivax* infections decrease most rapidly as age increases. Splenic rate falls rapidly between 5 and 10 years.

(v) The use of prophylactic quinine is recommended.

Trypanosomiasis.

Only two cases were reported during the year as compared with 5 cases in 1934, 32 cases in 1933 and 10 in 1932.

One case was found in the endemic area in the Kota-Kota district and one case at Fort Johnston, the latter case presented many interesting features. He was kept under observation for six months and except for two very transient rises of temperature manifested no signs of his infection, but as trypanosomes were found in his blood during this period, he was apparently a carrier of the disease.

Further details of this case are given in the Annual Report of the Entomologist which is attached to this Report.

In the Kota-Kota district, some hundreds of bloods were examined for the presence of trypanosomes with negative results.

(c) INFECTIOUS DISEASES.

Yaws.

A total of 4,400 cases were treated during the year as compared with 2,683 in 1934, an indication of increased confidence in European methods of treatment.

Cerebro-spinal Meningitis.

Only one case was reported during the year.

Enteric group of Fevers.

In spite of the primitive sanitary conditions prevalent among the native population, extremely few cases of typhoid fever are recorded. It is considered that the disease when it does occur is a serious one and is accompanied by a heavy mortality.

Two cases occurred amongst Europeans in the Lilongwe district and three amongst Europeans in the Zomba district.

Dysentery.

The total number of cases reported was 2,337 as compared with 2,135 cases in 1934.

The total is swollen by some 1,883 cases reported as attending the rural dispensaries. Amongst Europeans 65 cases of amoebic dysentery occurred as against 53 in 1934. In Zomba certain improvements in the sanitation were carried out, septic tanks were installed in the majority of European quarters, refuse was removed and incinerated, night soil from African latrines was disposed of in deep and fly proof pits.

Although these measures had considerable influence on the fly population, yet the incidence of amoebic dysentery declined very slightly, there being 29 cases as compared with 33 cases for 1934.

Out of the 29 cases, however, at least 15 were relapses or recurrences.

The seasonal incidence of this disease tends to disappear—and one wonders what is the commonest mode of transmission ?

It may be assumed that a large proportion of the 'undefined' cases which are reported, are suffering from amoebic dysentery. It is probable, therefore, that the number of chronic carriers is increasing yearly and that the potentialities for the spread of the disease especially in districts where no sanitary accommodation exists are far greater than formerly.

Tuberculosis.

The record of all forms of this disease treated at hospitals during the past eight years is as follows :—

1928	1929	1930	1931	1932	1933	1934	1935
73	40	128	171	220	104	228	243

The number of cases reported in 1935 includes 6 European cases.

During the year an investigation was undertaken in the Fort Johnston district on a number of unselected children to determine the percentage tuberculized in the age groups 0-5 and 5-10 years. The Medical Officer undertaking this investigation reports as follows :—

---

* "Malaria in Nyasaland," J. Gordon Thomson, Proc. Roy. Soc. Med. 1935, February Vol. 28 No. 4.

“Children in the age groups 0-5 and 5-10 were selected and were given a thorough physical examination, name, age, sex and village being noted for future reference.

The percutaneous test of Moro for tuberculosis was then employed. (It should be noted that in addition to giving reliable results in children, this test is of especial value in dealing with natives, for the simplicity of the method and the absence of pain and discomfort begets confidence).

Formula.—

Tuberculin (orig. Kock)	10%
Ol. eucalypt.	5%
Paraffin moll.	ad 100%

A piece of ointment, the size of a pea, is rubbed into the cleansed skin over an area of 1 to 2 square inches by means of a small glass rod.

The subjects of the test were examined after 24 and again after 48 hours for evidence of reaction. In cases showing a positive result, careful search was made for evidence of focal response. The parents and relatives of all such children were examined for evidence of tuberculosis.

Interpretation of results.

A positive reaction was recognised by vesiculation in a raised, inflamed area of skin. This revealed that the subject of the test was *tuberculized.*

Where focal and systemic effects were detailed in addition to a local response, information was afforded as to the distribution of *active disease.*

	Age group 0-5.			Age group 5-10.		
Village	Examined	Positive	Active	Examined	Positive	Active
Mapila	34	4	—	42	10	1
Mtalimanja	42	5	1	64	17	1
Saidikasuwa	25	2	—	47	9	—
Mtundu	27	2	—	37	5	—
Dimba	23	1	—	40	3	—
Malilo	37	—	—	51	2	—
Totals	188	14	1	281	46	2
Percentage positive		7.4%			16.3%	

The total number of children examined was 469, of which 60, (12.7%) are tuberculized.

It is possible that lower figures might have been obtained had this investigation been conducted late in the year, for, in the early months of 1935 a mild epidemic of measles occurred in and around Fort Johnston. As is well known, in many cases measles activates tuberculosis and had the tests been applied after this stimulation had worn off, a false impression as to the degree of tuberculization existing might have been obtained.

Three cases of active disease were found :—

(*a*) Male aet. 5. T.B. Hip. Mother suffering from pulmonary tuberculosis. Father healthy, brother, aet. 7, tuberculized.

(*b*) Male aet. 10. T.B. Glands in neck. Grandmother suffering from pulmonary tuberculosis. Mother and father healthy. Brother and two sisters healthy.

(*c*) Male aet. 7. T.B. Glands in neck. Source of infection not discovered. Family, with exception of tuberculized sister, aet. 10, is healthy.

Routine examination of all contacts of children showing tuberculization *only* failed, with one exception, to reveal the source of infection.

Conclusions.

With such a simple means of detecting tuberculosis, advanced cases are an expression of neglect.

A certain number of children in this district are known to be tuberculized and since it is not possible to predict in which of them the infection will yield clinical evidence of its presence, it is essential that they be closely watched and that their every illness be interpreted in the light of this known fact. At periodic intervals these children should be examined and in this way the first signs of active tuberculosis cannot fail to be detected. Their future health depends upon their resistance, and this, under their present conditions, is likely to be low.

Sensitivity to tuberculosis is great. Native children react excessively to the usual strength of tuberculin employed, (10%). With an ointment of reduced strength, 2%, it was found that a positive reaction was still given in every case previously responding.

The mode of life adopted by the African native is conducive to the spread of tuberculosis. Huts are small, possess no windows and are carefully sealed at night, when the whole family sleep together in close proximity. It is observed that mothers chew the food intended for their children, that most families have a common pot of food and a common drinking vessel.

The spread of the disease in this District is favoured by the high humidity of the air, which permits of prolonged life of any organism, particularly of those that are inhaled. In addition, not only is the diet inadequate, but in many cases it is also deficient in accessory food factors, and although this has no direct relationship to tuberculosis, a low standard of diet cannot be dissociated from it.

Risk of infection in the immediate vicinity of Fort Johnston is increased by the constant influx of strangers from all parts.

The constant propaganda which has gone on amongst the natives of this District during 1935, has paved the way for an attack on the source of the infection by correction of unhealthy modes of life. That this is the real crux of the problem is shown by the fact that human tuberculosis of bovine origin is stated to be rare in Nyasaland."

Small-pox.

The epidemic of small-pox which commenced towards the end of 1928 has now abated. During the epidemic years the number of cases has been as follows :—

	Cases.	Deaths.
1929	1029	44
1930	4661	211
1931	7414	239
1932	4106	180
1933	3412	96
1934	814	25
1935	170	11

During the period 1929 to 1935 inclusive, 1,483,756 successful vaccinations were carried out.

Bearing in mind that a considerable number of unvaccinated natives enter the Protectorate every year from across the Portuguese border, and that many indigenous children manage to evade vaccination, it is tolerably certain that sporadic cases of small-pox will continue to occur.

A further reduction in the number of cases of small-pox occurred, 170 with 11 deaths being recorded as opposed to 814 cases with 25 deaths during 1934.

VACCINATION ANNUAL REPORT FOR THE YEAR 1935.

Name of District	Successful	Modified	Unsuccessful	Not seen	Total
Blantyre	2,966	1,687	1,381	2,247	8,281
Chikwawa & Neno	12,167	5,220	3,024	1,002	21,413
Chinteche	1,195	977	978	915	4,065
Chiradzulu	2,171	670	614	482	3,937
Cholo	10,646	11,707	1,056	—	23,409
Dedza	7,136	1,902	1,114	1,464	11,616
Dowa	2,828	2,133	912	170	6,043
Fort Johnston	9,263	5,927	977	1,872	18,039
Fort Manning	5,823	5,130	1,613	—	12,566
Karonga	3,582	514	373	122	4,591
Kasungu	2,399	972	638	691	4,700
Kota-Kota	3,091	1,954	1,435	—	6,480
Lilongwe	11,262	1,965	1,126	50	14,403
Liwonde	3,844	1,715	1,192	678	7,429
Mlanje	21,406	12,949	5,476	25,293	65,124
Mzimba	4,834	2,917	2,264	1,034	11,049
Ncheu	5,906	736	1,104	781	8,527
Port Herald	11,345	4,071	2,522	1,431	19,369
Zomba	6,601	1,241	543	1,240	9,625
TOTAL	128,465	64,387	28,342	39,472	260,666

Venereal Diseases.

Syphilis.—1,511 cases of syphilis were treated at hospitals as compared with 1,324 cases in 1934 and 1,383 cases in 1933.

The considered opinion of all medical officers is that this disease is on the increase. It is probable that the disease is disseminated to a considerable extent by returning emigrants from neighbouring territories, the disease is particularly difficult to treat especially amongst women owing to the lack of both European and African nursing sisters at the hospitals. Infected women, even of the prostitute class, are shy of admitting infection and will often attend hospital for some other imaginary complaint. A serious feature with regard to this disease is the fact that a large number report sick when in the secondary stage of the disease and are thus unlikely ever to become 'Wasserman' negative, an equally large number will not submit to a complete course of treatment. One medical officer states he has seen a number of small children suffering from syphilis, not congenital, but possibly acquired from prolonged and close contact with mothers suffering from florid secondary symptoms.

An interesting case was seen at a native hospital of a man who had infected his finger from a primary sore on the penis.

Gonorrhoea and its complications.—1,030 cases were treated during the year at hospitals and rural dispensaries as compared with 1,093 cases in 1934.

Typhus.

The first case of a typhus-like disease in this territory was recorded during the year.

The patient was a male European of 73 years, resident in the country for one year only; the pyrexia was of a relapsing type and the rash, macular and partly petechial, not fading on pressure was conspicuous on the whole body with the *exception* of the face, palms of the hand and soles of the feet.

No brown staining occurred and no scar such as might result from the bite of an arthropod was observed.

The Weil-Felix reaction, was as follows—At first the serum was negative in dilutions of 1/40 and 1/80 with Proteus OX19, but was positive in dilutions of 1/40, 1/80, 1/160 with Proteus OX2.

At a later date the Weil-Felix reactions were :—

	1/40	1/80	1/160
With Proteus X 19	—	—	—
,, Proteus X 19	+	+	+
,, Proteus OX 2	+	+	+
,, Proteus OX K	+	+	—

The case therefore appeared to be an atypical disease of the typhus group.

Leprosy.

There are in this country 12 clinics all administered by Missions, at which lepers are treated either as in-patients or out patients or both. All of them receive money grants from Government in proportion to the number of cases treated.

Arrangements in regard to staff, housing and maintenance of patients at the various clinics vary considerably. Some have a doctor in charge with a qualified nurse and native subordinates, the majority are in charge of a qualified nurse only. Housing varies from wattle and daub huts, to well-built red-brick structures. At some centres the lepers have been encouraged to grow their own food supplies, at others food is bought in bulk by the Mission concerned. One or two of the Missions have started schools for the lepers and though the majority of lepers may not be able to gain much knowledge from the instruction given, it is of great benefit to them to have their interest aroused and their minds distracted from their unfortunate physical condition.

The numbers under treatment at the Leper Centres, and the admissions, discharges and deaths are as follows :—

Name of Centre	Average No. of patients per quarter		Admissions		Discharges		Deaths	
	Male	Female	Male	Female	Male	Female	Male	Female
Bandawe	31.00	33.00	2	0	1	1	2	1
Domasi	15.00	10.50	6	10	13	7	7	1
Likoma	8.50	8.50	0	2	1	2	0	0
Likwenu	45.50	18.50	6	2	18	15	2	—
Livingstonia	4.00	3.00	1	0	1	0	0	1
Loudon	10.50	6.50	3	1	2	1	2	0
Malamulo	191.00	58.25	70	23	31	7	3	1
Malindi	20.50	10.75	11	4	5	3	2	2
Mkhoma	4.00	4.00	2	2	0	0	1	0
Mua	39.00	25.50	3	10	4	2	8	2
Mwami	23.75	15.50	7	4	2	0	1	0
Utale	70.50	27.00	34	10	8	7	11	0
			145	68	86	45	39	8

In addition to the cases maintained and treated by the Missions, 88 males and 18 female lepers were treated as out-patients by Government medical officers.

It is on the whole the more advanced and crippled type of case which enters a clinic as an in-patient, and dealing with these is a very disheartening procedure. In some districts however cases come for treatment in the early stages of the disease, and—for instance at Malamulo—considerable success has been attained with these.

The Public Health Ordinance enables Rules to be made for the segregation and compulsory treatment of lepers, but no rules actually have been made, for the reason that any form of compulsion largely defeats its own ends.

Even though the percentage of cures is low, the Mission clinics are doing a large amount of good, for they care for unfortunates who would otherwise be left in misery, and they lessen the risk of the passage of infection to the next generation.

The financial assistance afforded by Government to these leper treatment centres amounted to £900 during the year. The cost of drugs for the treatment of leprosy supplied to these institutions was approximately £30.

Acute Poliomyelitis. Three cases were reported and attended as out-patients only.

One of these cases was an infant aged 12 months with paralysis of one leg, and another was an infant aged 18 months with paralysis of both legs.

This disease is rarely or never seen in the acute stage, it is probably mistaken by the parents for malaria.

D. VITAL STATISTICS.

(I) GENERAL AFRICAN POPULATION.

1. During 1935 the recording of births and deaths in the Fort Manning district was continued, and it was commenced in two sections of the Karonga district, one at high altitude (3500 feet—5000 feet), and the other at Lake level (about 1,700 feet).

2. As mentioned in previous reports, deductions made from figures obtained must be accepted with great reserve, but nevertheless the results are interesting.

3. The various rates for the past 3 years are as follows :—

	1933	1934	1935	Karonga 1935
Birth-rate	68.2	57.6	52.9	55.0
Death-rate	25.8	27.7	21.2	25.3
Infantile mortality	97.3	154.6	73.4	199.6
Still-birth rate	89.3	75.8	96.0	15.6
Percentage of deaths in age-groups.				
0—1 year	24.9	32.2	18.4	43.3
1—5 years	18.4	19.8	12.8	10.2
5—15 ,,	16.6	13.0	26.1	8.3
Adult	41.1	35.0	42.7	38.2

4. The contrast between the two sections of the Karonga district is marked.

	A. Section (Low altitude)		B. Section (High altitude).
Birth rate	52.2	per 1000 of population.	61.0
Death rate	28.5	,,	18.4
Infantile mortality	251.0	per 1000 live births.	102.4
Still-birth rate	20.0	,, ,, ,, ,,	7.6

5. It is probable that the birth and death rates are approximately accurate, but the infantile mortality rate, the still-birth rate, and the age-incidence of deaths give only a general indication of the conditions existing. The infantile mortality rate and the still-birth rate should be read together, for it is tolerably certain that many deaths which occur within the first few hours of life are entered as still-births. Then too, since most mothers can state the age of their infants only in the most general terms, and continue to nurse them for two years or more, it is probable that many deaths occurring between the ages of one and two are entered in the category of infant deaths.

6. In the Fort Manning district there were 32 twin births, producing 39 male and 25 female children, of which 6 males and 4 females were still-born. Two triplet births occurred, the children being 2 males and 4 females all of which were still-born. It is noticeable that in twin births male children predominate while in single births, females do so.

7. Emigration of young male adults which has been increasing of recent years, must have a considerable effect on the vital statistics of the community, the more marked because many of them never return. It has been estimated that in some districts as many as 60 per cent of males between 18 and 45 are abroad. A falling birth-rate is to be expected, and possibly a rising illegitimate birth-rate, though on the latter point no reliable information is either available or under present circumstances obtainable. The age distribution of the population must also be affected, and indeed this is obvious from direct observation for it is common in the villages to find that the inhabitants consist chiefly of women, children and old men.

8. Emigration takes place from all districts whether high or low-lying, where economic conditions are bad, but recruited labour is for the most part obtained from the highlands. There are no records or information to show that the lowland emigrant suffers more by emigration than the highlander, but the high indigenous morbidity of the former would suggest that he is less able to resist the harmful effects of alien and strenuous labour in strange surroundings.

9. The more remote, but possibly more serious effects of emigration on a large scale can only be conjectured. It is apparent that the social life if not the social structure of the native community is undergoing a change, but whether this change is only temporary or whether it will be ultimately beneficial, it is perhaps impossible to foretell. H.H.B.F.

(II) ASIATICS.

The Asiatic population is at a standstill, no increase being shown in the figures for 1935

There has been a considerable decrease since 1932 when the population was stated to be 1,583. This year it is estimated at 1,400.

During the year there was 63 births and 16 deaths.

The causes of deaths were :—

	Males		Females	
	Adults	Infants	Adults	Infants
Malaria	1	3	2	1
Blackwater fever	3	—	—	1
Beriberi	—	—	1	—
Eclampsia	—	—	1	—
Diabetes	1	—	—	—
Cardiac failure	1	—	—	—
Pneumonia	1	—	—	—
	7	3	4	2

(III) EUROPEAN, GENERAL POPULATION.

The total European population is estimated at 1,781 a decrease of 19 as compared with last year.

During the year forty-four births and eleven deaths were recorded, the causes of death were :—

	Males		Females	
	Adults	Infants	Adults	Infants
Ulcer of stomach	1	—	—	—
Blackwater fever	2	—	—	—
Malaria	—	—	—	1
Diphtheria	—	—	—	1
Gastro-enteritis	—	—	—	1
Myocarditis	1	—	—	—
Marasmus	—	1	—	—
Broncho-pneumonia	—	—	—	1
Shock following immersion	1	—	—	—
Tuberculosis	—	—	1	—
	5	1	1	4

(IV) EUROPEAN OFFICIALS.

During the year the sick rate was, on an average taken over the last five years, slightly increased.

The following table shows the sick, invaliding and death rates of the European officials :—

	1932	1933	1934	1935
Total number of officials resident	267	282	276	266
Average number resident	212	202.6	205.7	208.3
Total number on Sick List	95	105	125	113
Total number on days on Sick List	1,136	1,808	1,708	1,781
Average daily number on Sick List	3.1	4.9	4.68	4.88
Percentage of sick to average number resident	1.4	2.4	1.66	2.36
Average number of days on Sick List for each patient	11.9	17.2	13.66	15.6
Average sick time to each resident (days)	5.3	8.9	8.3	8.77
Total number invalided	3	10	7	6
Percentage of invalidings to total residents	1.1	3.47	2.53	2.25
Total deaths	2	2	0	0
Percentage of Deaths to total residents	0.7	0.7	0	0

The causes of invaliding were :—

1. Chronic appendicitis and otitis media.
2. Hydrocele.
3. Neuritis and secondary anaemia.
4. Sciatica and chronic nephritis.
5. Chronic alcoholism.
6. Psychic epilepsy.

(V) NATIVE OFFICIALS AND NATIVE TROOPS.

The native officials numbered 2,457 as compared with 1,987 in 1934, the increase being chiefly accounted for by the influx of King's African Rifles' recruits.

The term native officials includes police and native troops but excludes casual labour in receipt of less than ten shillings a month.

The prevailing disabilities and the number of days off duty are compared below with those of the previous year.

	1934		1935	
	No. of cases	No. of days off duty	No. of cases	No. of days off duty
Malaria	102	288	120	697
Influenza	91	594	35	184
Injuries	66	656	101	1,499
Respiratory affections	52	207	79	697
Dysentery	27	301	42	417
Venereal diseases	28	703	60[*]	1,463[*]

The causes of death were:—

Pneumonia	5	Injuries	1
Cholecystitis	1	Chronic rheumatism	1
Cerebral malaria	2	Duodenal ulcer	1
Pyrexia of unknown origin	1	Pneumococcal peritonitis	1
Carcinoma of bladder	1	Dysentery	1
Carcinoma of liver	1	Myocarditis	1

Table showing the sick, invaliding and death rates of native officials.

	1932	1933	1934	1935
Total number of native officials	1,848	1,979	1,987	2,457[†]
Total number on Sick List	544	431	721	933
Total number of days on Sick List	5,135	6,336	6,309	10,427
Average daily number on Sick List	14	17.4	17.3	28.5
Percentage on Sick List	0.7	0.7	0.8	1.12
Average sick time to each patient (days	9.4	14.7	8.75	11.20
Average sick time to each official (days)	2.7	3.2	3.17	4.23
Total number of deaths	11	16	11	17
Percentage of deaths amongst native officials	0.59	0.81	0.5	0.65

The health of the troops on the whole has been good. During the year a considerable number of recruits arrived in Zomba, and unfortunately caused a considerable rise in the incidence of venereal diseases.

During the year all in-patients were transfered to the new African Hospital where up-to-date accommodation is provided, the old building in the King's African Rifles lines used as a hospital, being abandoned.

SECTION III. HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE

Financial considerations again made it impossible to increase the sanitation staff. It was found possible, however, owing to the retention of a temporary Sanitary Superintendent for the full year to utilize the services of the Senior Sanitary Superintendent in spheres other than the three European townships of Zomba, Blantyre and Limbe.

Some of the smaller townships were visited and an endeavour was made to improve the deplorable sanitary conditions which obtain throughout the Protectorate.

A visit of some 3-4 months was also made to Kota-Kota, one of the largest villages on the shores of Lake Nyasa (some 5,000 huts and 12,000 inhabitants) and the opportunity was taken to carry out permanent drainage works and other anti-malarial measures.

A pit latrine campaign was instituted and at the end of the Sanitary Superintendent's visit a total of 517 had been dug of which a considerable number were in use. Simple lectures were given to all headmen and it was made evident to the natives that it was possible to a large extent to prevent ill-health and sickness without outside assistance and with little expenditure.

In the annual report for last year a proposal was put forward for the amplification of the scheme for community training given at the Jeanes' School, and there is, thanks to the generosity of the Carnegie Trust and the provision of a further grant, every chance of commencing a training scheme for 'welfare workers' during next year. Such welfare workers when trained will be apportioned to native authorities and principal headmen and if their activities reach only to the level attained by the Jeanes' teacher considerable benefit should result.

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[*] 46 cases occured amongst natives ranks of King's African Rifles resulting in 1,238 days off duty.

[†] Includes 350 native ranks.

(I) Preventive Measures.

Malaria and Malaria Prevention.

The incidence of malaria in the group of epidemic, endemic and infectious diseases, amounted to 47.51% in the year under review, and accounted for 26.98% of the deaths in the same group.

For the last two years routine examinations of blood films have been made in the out-patient department at Fort Johnston and show that between 69% and 71% of *all* native patients attending hospital for treatment are suffering from one type or another of malaria.

The children form the larger part of the infected and the majority of the parasites are of the sub-tertian variety.

The spleen rate shows that although the endemicity is high the infectivity is low: the greater number of spleens show a one finger enlargement. Schistosomiasis is very common in this district and may have an influence on the spleen rate.

Efforts at prevention consist, essentially, of filling in pools, drainage schemes, oiling and destruction of mosquito breeding places, treatment of cases of malaria, prophylactic issue of quinine to the Europeans and more adequate mosquito proofing of houses.

In the Mlanje district an attempt was made to carry out a mosquito survey and anti-malarial measures on one of the larger tea estates. A large scale map was prepared and a hut to hut census was taken of the native employees and their families. Blood films were taken and splenic indices recorded from all children between the ages of 2 and 10 years.

One swamp was successfully drained and other areas are being dealt with.

Unfortunately the Medical Officer, with 135,000 natives to look after, a busy hospital and numerous dispensaries, could not devote adequate time to complete the survey, arrangements are being made, however, by this estate for a trained man from the Ross Institute to continue the work.

In the majority of the stations and also in the larger townships efforts are being made to remove all the women and children from close proximity to European quarters, this measure and the adequate mosquito proofing of all houses should enable the European official and his family to remain reasonably free from infection with malaria, at any rate, at the place of residence.

The eradication of malaria in such a hyperendemic country as Nyasaland is considered to be impossible, the problem must be tackled by the following general measures:—

(*a*) Education of the population.
(*b*) The introduction of a cheap and reliable form of treatment.
(*c*) Raising the standard of living and the creation for a demand for better housing and sanitation.
(*d*) Improved methods of agriculture.
(*e*) Improvement of food supplies.
(*f*) Development of a sense of responsibility.

Helminthic Diseases.

Ankylostomiasis and schistosomiasis are the two common helminthic diseases, some slight idea of their prevalence is conveyed by the figures given in Section III. under the heading 'Medical Surveys'.

Schistosomiasis, especially in its rectal form is probably responsible for a high mortality amongst infants, as Dye has already shown, heavy infections producing a fatal form of cirrhosis of the liver.

The eradication of these and other endemic diseases presents a difficult problem, treatment, unless followed up or preceded by sanitary improvements, and unless precautions are taken against reinfection is to a large extent valueless.

Something can be done in the way of preventive methods by the provision of pure water supplies, latrines and bathing places where no chance of reinfection can occur.

As the standard of village life improves so will these diseases tend to die out.

Mass treatment for hookworm unaccompanied by the correct provision of latrines has been practically abandoned.

7,726 cases of ankylostomiasis and 7,323 cases of schistosomiasis were treated at hospitals and dispensaries during the year.

There were two cases among Europeans, one of hookworm and one of bilharzia.

(II) General Measures of Sanitation.

In the report for the year 1934 it was stated that "the promotion of public health has not progressed to the same extent as other activities in the Protectorate." This is still true, but it is pleasant to be able to record that the natives have begun to take a definite interest in health and hygiene, largely as the result of courses for native chiefs given at the Jeanes' school, and of lectures and demonstrations given to the villagers by medical officers. The courses at the Jeanes' school are of immense value, not so much perhaps for the matter which is taught, but because they awaken the interest of the chiefs in health matters, and show them how by their own unaided efforts they can effect great improvements.

Several native authorities have asked for the services of trained African sanitary inspectors, and have offered to pay their wages. In many villages decent latrines—either communal, or individual, have been constructed, sources of water-supply have been developed and properly protected, huts of a better type are being constructed, and the villages themselves are subjected to a weekly clean-up.

Little or no compulsion is exerted on the natives, even in cases where the law expressly provides for it, for it is obvious that better and more lasting effects can be produced by the willing and intelligent co-operation of the natives, than by forcing them to do things for which they can see no reason, and which often run counter to their ingrained customs.

An interesting illustration of what can be effected by instruction and persuasion occurred in the Fort Manning district, where an ancient custom of the Achewa tribe forbids a husband to obtain medical assistance for his wife or child except with the sanction of the wife's uncle or brother. The result of this was that frequently a woman in difficult labour or an ailing child, was left to die without medical attention, in spite of the wishes of the husband or father. The District Commissioner and Sub-Assistant Surgeon discussed the matter with the Chief of the Achewa, and he subsequently called a meeting of all the Achewa headmen including some from across the Rhodesian border. At the meeting it was decided that the custom was a bad one, and that in future a husband who wished to obtain medical assistance for his wife or child should do so without hindrance, and that the customary payments which were made to the wife's uncle or brother on the death of wife or child should be abolished. In view of the tenacity with which tribal natives cling to inherited customs, this tribal decision is of considerable significance.

The spirit of emulation is also of great assistance in improving hygienic conditions. It is commonly found that when a progressive village headman has been persuaded by the advice of a medical officer and the encouragement of the district commissioner to rebuild his village, and to provide the elementary requirements of sanitation, neighbouring headmen pay a visit of inspection, and subsequently ask the medical officer to advise them what to do to improve matters in their own villages.

It is not of course suggested that the majority or even a large number of the native authorities are interesting themselves to the extent indicated above, for practically all of them are very poor, and some are both ignorant and indolent. Moreover in some parts of the country emigration has taken place to such an extent that headmen have some difficulty in finding amongst their own people the labour that is required.

It is part of the policy of the medical department to second to selected native authorities well trained African sanitary inspectors, who have spent two or three months attending the practice of the Jeanes' school, so as to become conversant with the various aspects of native welfare work, and so be able to co-operate more effectively with their fellow workers from other departments. It is hoped that three of these will be available by the end of the current year (1936).

Sanitary conditions in the European townships are gradually improving, progress being hampered chiefly by lack of funds.

Limbe, Zomba and Blantyre all have schemes for a properly laid out African village, situated on the borders of the townships, in which all natives permanently employed in the townships must live. Zomba and Limbe have made considerable progress with their schemes, but in Blantyre the problem is a much larger one and the financial aspect of it is one of much difficulty.

In Zomba the water and sanitation scheme has been completed so far as the essentials of the water supply are concerned. But funds have sufficed to carry out little more than half of the sanitation scheme, so that Zomba is served in part by a water-carriage, and in part by a bucket system, the latter accompanied by most of the evils which such a system must entail in a town situated as is Zomba. The main idea of the sanitation scheme was to dispense entirely with the bucket system and with the disposal of untreated night-soil within the township.

The improvement which has taken place in the sanitary condition of Zomba is attributable to the installation of the piped water-supply, and the septic-tank system, and to the removal of resident natives from the township to a location of their own, although the septic-tank system and the native location are only partially completed. In order to control fly breeding in pit-latrines and night-soil pits the Sanitary Superintendent carried out a series of experiments with a solution of arsenite of soda, and with para-dichlorbenzene. These experiments are described in appendix II.

During the year several additional "sanitary areas" have been gazetted. These usually consist of a busy native market and a few Indian stores. The "sanitary boards" over which the District Commissioners preside have effected great improvements in these areas. An annual levy is made equally on plot holders, and this together with market fees, has provided the funds for the improvement of market buildings, the construction of latrines, and the development of water supplies.

The two European sanitary superintendents have sanitary charge of Limbe-Blantyre, and of Zomba respectively: they also make visits of inspection to neighbouring sanitary areas. During a part of the year three sanitary superintendents were available, and advantage was taken of this to send one of them on a tour of the districts, with the idea that he should advise and assist in regard to improvements in sanitation. The work he carried out in the short time at his disposal, has shown how valuable an additional European member of the sanitary staff would be.—H. H. B. F.

Medical Surveys.

Included in this section, as being the most appropriate place in the Report, is a *resumé* of the Medical Surveys performed in this territory during the year.

Such surveys serve an exceedingly useful purpose and should in the course of years provide valuable statistics, by these means the actual conditions under which the native population exists are determined and as a result very definite propaganda for improvement of general conditions is carried out. No one can doubt after reading this chapter that the necessity for increased knowledge into native habits, customs and conditions is urgent and essential to the welfare and development of these primitive people, over 5,000 persons were examined during the course of these surveys and a large majority received treatment. This mode of investigation presents an unrivalled method of approach to the rural population and this branch of work is considered to be of such value and interest, that at the risk of being prolix, a complete story of a medical survey is included as an appendix to this Report.

Although these reports disclose a very unsatisfactory and primitive state of sanitation, yet things are not as black as they are painted and if reference is made to Section III.B. it will be realised that under the enlightened rule of some of the native authorities conditions of village life are definitely improving.

In last year's Annual Report, reference was made to a series of medical surveys which were to be performed during 1935. Unfortunately, circumstances did not permit the full programme to be completed ; illness of members of the staff, diversion of personnel to duties in connection with an epidemic of measles and in one instance local prejudice against medical examination and the collecting of specimens, were the contributing factors towards some of the surveys being curtailed or abandoned.

It had been proposed that two surveys should be carried out in each district, one (a) in the vicinity of the hospital and the other (b) in an area devoid of medical facilities. It was not possible in every case to adhere to these arrangements, moreover, the results obtained indicated that the proximity of a hospital had little if any effect on the incidence of diseases dependent for their existence upon insanitary conditions. The results of the surveys will not, therefore, be summarised under the above heading. Climate and altitude have a definite bearing upon the incidence of protozoal and helminthic diseases, and the figures obtained from the district surveys have been tabulated on an altitude basis. Chiradzulu, Cholo, Fort Johnston, Karonga, Kota-Kota, Mlanje and Zomba (Chilwa Island), are 3,000 feet or less above sea level; Dedza, Lilongwe, Kasungu, Fort Manning and Mzimba stations are at an altitude of 3,200 to 5,250 feet. The latter areas have a mean minimum temperature varying from 51.1°F to 59°F while in the former areas, the mean minimum varies from 60.2°F to 77.9°F. Altitude and temperature are to some extent correlated.

The original classification of individuals into three age-groups was retained viz., Group I—under 2 years ; Group II—over 2 years and under 10 years ; Group III—over 10 years. Difficulties were experienced in obtaining the requisite number of young children in the first age-group, due principally to reluctance on the part of parents to bring infants for examination. In several instances the figures were so low they were not considered worthy of inclusion by the officers conducting the surveys.

With the exception of the Chilwa Island survey, a complete report of which will be found in Appendix I, the statistics obtained from the examination of specimens have not been differentiated according to sex. It is believed that a preponderance of males were examined as females are less willing to produce specimens or to submit to investigation. At Mlanje, where, during a previous survey, barely 50 per cent. of females could be induced to bring specimens, the Medical Officer, by adding a native nurse to the personnel of the survey staff before embarking on a second survey, overcame this difficulty successfully.

Sanitation of Villages. Little or no attention is paid to the question of sanitation by the uninstructed peasant. The people are extremely primitive and do not associate the state of their health with the condition of their surroundings. Even when advised in this matter, considerable apathy is displayed towards the possibility of effecting improvements. To some extent this lack of interest is due to chronic ill-health.

The following extracts from reports illustrate conditions prevailing in the areas investigated ;

MLANJE :

> "In this group of villages there are only 18 latrines. They are not deep enough nor have covers been provided. The general morbidity rate was very high ; only 35 were found negative to all parasites out of a total of 347 examined. This state of affairs is, in my opinion, directly attributable to the bad example of the Principal Headman, a man so indifferent to his own personal welfare, that although a chronic sufferer from schistosomiasis, ascaris and asthma, he preferred to die rather than take the trouble of coming to hospital for treatment. Schistosomiasis and ascaris are the most prevalent helminthic infections the latter being more prevalent than hookworm in this area.

There are no refuse pits, rubbish is left to rot where it is thrown. Sanitary conditions are very unsatisfactory. Several times this year I have shown these people how to improve their surroundings. It has been impossible to get them to make the slightest effort: their one and only interest in life is the brewing of beer. For the whole week I was at the village drums were beating almost continuously".

Much can be accomplished by the co-operation of an energetic Native Authority capable of enforcing the sanitary measures advised. In another section of this district, better conditions prevail:

"Huts and their surroundings are quite clean; refuse pits are in general use. These people take an interest in their gardens and in consequence reap the benefit when the marketing season arrives.

In this group of villages there are 146 latrines serving 334 huts. Worthy of special comment is the large number whose faeces were found negative, viz., 346 out of 375 examinations. This is the result of having latrines *and using them.*

Urinary schistosomiasis and malaria are the two principal infections. Hookworm is more prevalent than roundworm; in most parts of this district ascaris predominates."

The incidence of hookworm and ascaris in the area referred to above is 5.6 per cent. and 1.6 per cent. respectively, lower probably than elsewhere in the Protectorate.

FORT JOHNSTON:

"The dambo lying behind the village is used as a latrine ground, native gardens are also used for this purpose.

All refuse from each hut is to be found lying around outside. Fish form a great part of the diet of these people and the smell from decaying offal is offensive.

The huts are small, dark and filthy—inside and outside. Standing crops are found between each group of houses."

CHIRADZULU:

"Refuse is deposited close to the huts creating a nuisance. There are no latrines in the village; adults relieve themselves in the adjacent bush, children pass their stools in the vicinity of the huts."

CHOLO:

"There are few latrines in use. Helminthiasis is very prevalent; hookworm or ascaris eggs were found in 218 out of 309 stools examined."

KOTA-KOTA:

"There are no latrines in this village. Hookworm eggs were present in 66 per cent. of stools examined. Fishing in backwaters and working in flooded rice fields appear to maintain the high incidence of urinary schistosomiasis recorded, viz., 76 per cent. The village is situated on a series of sandbars and the nature of the site would appear to render the introduction of a pit latrine system impossible."

KASUNGU:

"On the whole, villages are cleaner than formerly. Some 60 per cent. of the villages are now provided with latrines and refuse pits, most of which are used."

MZIMBA:

"These natives own large herds of cattle. Cattle kraals are built in the centre of the village. Manure is not removed from the kraals, it is permitted to remain there rotting.

As a rule villages are not provided with latrines. Where mission teachers reside, villages are found to be cleaner than elsewhere."

The majority of these village reports indicate an appalling condition of affairs yet it must be remembered that many of the surveys were concerned with communities which from force of circumstances are out of touch with Europeans in general and the medical staff in particular, the above extracts, therefore, must not be assumed to be of universal application but rather to indicate how large a proportion of the population still lives under extremely primitive conditions.

Food Supplies. Maize and cassava are the main sources of carbohydrate; millet when grown is used principally for the manufacture of beer.

Mangoes, pineapples, oranges, bananas and paw-paws are utilised by natives where nature has provided them, otherwise, except where a European community stimulates demand, practicably no efforts are made to introduce or encourage cultivation of these fruits.

Villagers residing on the Lake littoral have an adequate and cheap supply of first class protein available in the form of fish. Inland tribes are not so fortunate. Dried fish is expensive by the time it reaches them, outside Government centres, cattle are not regularly killed for food except perhaps during the seasons when tobacco or cotton markets are being held and money is circulating freely. To the majority of the inhabitants, meat and fish are luxuries and reliance is placed upon the bean crop to provide the necessary protein.

Where conditions are suitable and a demand exists, European vegetables such as tomatoes, potatoes, carrots, turnips and lettuce are grown for sale. It is not known to what extent these vegetables—with the exception of tomatoes—are made use of by the native community. More general use is made of the indigenous sweet potato, pumpkins, ground-nuts and a form of spinach.

It will be observed that the requirements of a balanced dietary are available. As is usual in an agricultural community with a low standard of living, the consumption of carbohydrate is excessive. Carbohydrates are the cheapest form of foodstuffs and the more general use of the required quantity of first class protein is dependent upon a higher standard of living, difficult to attain at a time when prices of agricultural products are low.

Water Supplies. The sources of supply are on the whole, unsatisfactory. Usually the supply is adequate but owing to the insanitary habits of the community gross contamination occurs; latrines are lacking or improperly constructed; during the dry season, dried up water courses are used as defaecating grounds on account of the privacy afforded by undergrowth; water holes are unprotected from pollution by animals while bathing, washing of clothes and the drawing of water are frequently carried out at the same place.

In Mlanje district a good supply of drinking water is available from a deep well within two miles of one group of villages yet the natives prefer to draw upon two filthy water holes—described by the Medical Officer as being no better than cesspools—merely because they are more conveniently situated. Over 40% of these people are infected with *S. haematobium*.

DEDZA: "The water supply is taken from a dirty stream. An uncleaned cattle kraal in the vicinity contaminates its waters."

LILONGWE: "At the time the survey was held water was scarce, supplies being obtained from a water hole 9 feet deep in an adjacent dambo. Water was drawn in a very unsatisfactory manner; women descended into the water hole to fill their jars, 23% of adults examined were found to be harbouring *E. histolytica* in either cystic or vegetative form; seven persons complained of dysentery in an acute form.

Latrines were were practically non-existent but before the survey terminated, 36 were constructed."

Lakeside conditions are considerably better. The Medical Officer, Fort Johnston, states "Water for household purposes is taken direct from the Lake at a place where the shore is clear of reeds. This water should be comparatively free from contamination except that given to it by large numbers of scabrous children who disport themselves in it all day."

This is confirmed by the Medical Officer, Kota-Kota, in a reference to a Lake shore survey: "The Lake shore is an open sandy beach—free from vegetation. It provides safe bathing facilities and an excellent water supply. Full use is made of these natural advantages by the villagers."

During the course of the surveys, the dangers to health resulting from the use of impure water were explained and where possible simple measures for improving the sources and protecting them from pollution were demonstrated. A large proportion of the seed of propaganda falls upon stony ground, unless the native authority is enthusiatic, no very active steps are taken to institute the improvements suggested. If trained welfare workers were available they would be required to follow in the path of the survey and by regular visits to the area ensure that any recommendations made were adopted.

TABLES SUMMARISING THE RESULTS OF THE SURVEYS.

The results of the surveys performed in Chiradzulu, Cholo, Fort Johnston, Karonga, Kota-Kota, Mlanje and Zomba districts appear in the following tables under the heading "District Group A" while those obtained from Dedza, Lilongwe, Fort Manning, Mzimba and Kasungu districts comprise "District Group B."

TABLE I.

Age distribution of individuals examined.

	First age-group	Second age-group	Third age-group	Total
District Group A	420	1,263	962	2,645
District Group B.	387	707	1,172	2,266

Owing to difficulties previously referred to, a complete series of specimens was not obtained from everyone recorded in the above Table.

TABLE II.

Nature and number of specimens obtained.

District Group A.

Specimen	Number obtained First age-group	Number obtained Second age-group	Number obtained Third age-group
Blood—for Hb estimation ...	420	1,260	962
Blood films ...	420	1,268	962
Urine ...	361	1,230	930
Faeces ...	369	1,242	937

District Group B.

Specimen	Number obtained First age-group	Number obtained Second age-group	Number obtained Third age-group
Blood—for Hb estimation ...	120	284	532
Blood films ...	138	313	516
Urine ...	50	224	391
Faeces ...	87	210	350

Before submitting further details of these investigations, it may be mentioned that the population of the area represented by "District Group A" numbered about 600,000 and that of "District Group B." 471,000. The proportion of those examined to the total population is therefore undesirably low from a statistical point of view. It is proposed, however, to continue these surveys annually until conditions throughout the country have been explored thoroughly.

Haemoglobin estimation by Tallquist's method. After scrutinising the following tables, one is tempted to enquire (*a*) what is the haemoglobin percentage of a normal native and (*b*) what is the definition of a normal native?

In a report of one survey, the officer who conducted it states:

"Throughout the survey I was impressed by the great degree of immunity or tolerance these people appear to have developed towards the endemic diseases of the country. Individuals heavily infected with various parasites showed no outward physical signs of disease."

This tolerance is more apparent than real especially in the first and second age-groups where the debilitating effects of malaria and schistosomiasis are evident by the low haemoglobin percentages recorded from districts where those diseases are very prevalent. Judging from the figures obtained from surveys in the Cholo district, it would appear that a high incidence of hookworm and ascaris—even when associated with a spleen rate of 40% to 50%—contributes less towards a low average haemoglobin percentage than hyperendemic malaria in combination with a high incidence of urinary schistosomiasis, such as prevails at Kota-Kota, Mlanje and Zomba.

TABLE III.

District Group A.

Hb%	Total No. estimated First age-group, 420.					Total No. estimated Second age-group, 1,260.							Total No. estimated Third age-group, 962.				
	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba	Chiradzulu	Cholo	Ft. Johnston	Karonga	Kota-Kota	Mlanje	Zomba	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba
100	5	—	—	1	—	—	40	—	—	—	7	—	59	—	—	40	—
90	25	39	1	—	—	—	77	11	—	—	41	—	70	2	4	84	—
85	—	—	—	—	—	—	1	—	—	—	—	—	3	—	—	—	1
80	38	88	1	7	—	4	68	49	2	—	54	8	61	33	25	84	6
75	—	—	—	—	1	—	3	—	—	6	—	12	3	—	—	—	12
70	9	73	—	15	7	35	37	107	1	—	93	49	30	99	5	91	27
65	1	—	—	—	12	—	3	—	—	79	—	16	2	—	—	—	10
60	6	—	1	32	19	67	23	33	1	—	67	18	24	66	1	68	5
55	1	—	—	—	7	—	1	—	—	63	—	1	7	—	—	—	1
50	2	—	—	15	4	62	11	—	—	—	19	2	22	—	—	12	1
45	—	—	—	—	—	—	—	—	—	49	—	—	—	—	—	—	—
40	—	—	—	6	1	31	—	—	—	—	1	—	—	—	1	2	—
35	—	—	—	—	—	—	—	—	—	3	—	—	—	—	—	—	—
30	—	—	1	2	—	1	—	—	2	—	2	—	—	—	1	—	—
Number estimated per district survey	87	200	4	78	51	200	264	200	6	200	284	106	281	200	37	381	63
Average Hb%	80	78.3	65	60	61	55.8	81.2	71.9	58.3	56.8	71.4	68.3	80.8	68.5	76.5	77.2	70
Average Hb% per age-group	70					68.4							75.9				

District Group B.

Hb%	Total No. estimated First age-group, 120					Total No. estimated Second age-group, 284.					Total No. examined Third age-group, 532.				
	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu
100	—	1	—	—	—	5	3	—	—	—	25	18	—	—	—
90	1	2	1	—	—	3	2	—	—	—	26	10	9	—	3
80	—	3	2	—	—	—	1	24	—	4	16	15	11	7	18
70	2	8	2	—	6	2	14	23	—	17	12	36	9	26	60
60	5	11	2	—	13	4	29	18	6	27	21	69	5	16	33
50	2	7	—	7	4	7	20	10	30	12	22	37	—	—	9
40	3	2	—	28	4	5	4	—	9	4	10	4	—	1	1
30	3	- -	—	1	—	1	—	—	—	—	3	—	—	—	—
Number estimated per district survey	16	34	7	36	27	27	73	75	45	64	135	189	34	50	124
Average Hb%	52.5	64	71.4	41.6	58	64	60	68	50	60.7	72.6	66.5	77	67.6	67.6
Average Hb% per age-group ...	55.6					61.2					69.1				

It was not anticipated that haemoglobin percentages would be so low in these districts. In the case of Dedza it is difficult to account for; malaria and hookworm infections are almost negligible and no cases of schistosomiasis are recorded. Possibly the anaemia is due to nutritional defects; further investigations are desirable.

Mzimba is a large district with a population of 135,000. The medical facilities available consist of a hospital and seven rural dispensaries under the supervision of a Sub-Assistant Surgeon. This district and one adjoining it—Chinteche—possess unlimited scope for investigation.

TABLE IV.

District Group A.

Summary of spleen examinations.

	Number examined First age-group, 342				Number examined Second age-group, 1,263						
	Cholo	Ft. Johnston	Karonga	Zomba	Chiradzulu	Cholo	Ft. Johnston	Karonga	Kota-Kota	Mlanje	Zomba
Spleen—not palpable	56	179	—	—	72	137	147	—	85	106	7
Spleen palpable	2	—	1	4	61	10	2	3	8	28	36
Spleen—enlarged one finger	14	—	1	4	7	53	12.	—	34	42	16
Spleen—enlarged two fingers	10	2	1	20	25	41	12	1	51	57	35
Spleen—enlarged three fingers	4	8	1	13	29	21	20	2	16	28	10
Spleen—enlarged four fingers	—	7	—	4	1	3	7	—	4	11	—
Spleen—enlarged a hand's breadth ...	—	4	—	1	—	—	—	—	—	11	2
Spleen—enlarged to umbilicus	1	—	—	5	5	2	—	—	2	1	—
Number examined per district	87	200	4	51	200	267	200	6	200	284	106
Spleen rate per cent. per district	36	10.5	100	100	64	49	26.5	100	57.5	63	93
Average spleen rate per age-group ...	31%				56%						

District Group B.

	Number examined First age-group 353					Number examined Second age-group 635				
	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu
Spleen—not palpable	14	2	75	19	22	19	8	140	22	24
Spleen—palpable	—	—	2	50	3	—	6	13	41	13
Spleen—enlarged one finger	—	2	24	28	6	—	13	63	26	16
Spleen—enlarged two fingers	—	—	51	1	4	1	3	69	10	11
Spleen—enlarged three fingers	—	—	38	—	1	2	2	82	—	7
Spleen—enlarged four fingers	—	—	11	—	—	—	—	13	—	3
Spleen—enlarged a hand's breadth	—	—	—	—	—	—	—	1	—	—
Number examined per district	14	4	201	98	36	22	32	408	99	74
Spleen rate per cent. per district	0	50	62.6	80.6	39	13.6	75	65	77	68
Average spleen rate per age-group	63%					66%				

The number of examinations recorded from Karonga is small and may not be considered worthy of consideration. Conditions on the Lake shore, where the majority of the inhabitants of that district reside, are ideal for mosquito breeding and it is safe to assume that a more extensive survey confined to the Lake littoral would confirm that it is an area of hyperendemicity. Investigations on a larger scale have been arranged for 1936.

The comparatively low spleen rate of 26.5% in the "over 2 years and under 10 years" age-group is lower than recorded from other Lake side villages in the Fort Johnston district in the 1934 Annual Medical Report. Conditions are changing, due to the fact that the water level of Lake Nyasa is rising. The Medical Officer reports:

> "Rising of the Lake has killed a great deal of the sudd and reeds in front of the village but reeds still exist here and there. The sandy nature of the soil on which the village is built renders stagnation of water unlikely—even in the rains—and, the constant movement of the waves in those areas where reeds exist hinders the development of mosquitoes."

Even at the higher altitudes, malaria is very prevalent, Mzimba and Fort Manning recording spleen rates associated with hyperendemic areas.

Very little can be done to improve existing conditions. Permanent drainage works and bonification would be necessary on a scale beyond the financial resources of the country. The more extensive use of quinine would probably result in a reduction of the infantile mortality due to malaria but while breeding grounds exist over enormous areas quininisation of the populace might possibly result in loss of immunity and the subsequent occurrence of malaria in epidemic form.

Malaria may not be entirely responsible for the high spleen rate. In many of the districts referred to in the above table, urinary schistosomiasis is prevalent though this disease does not appear to contribute to any extent to the rate recorded from Mzimba.

TABLE V.

District Group A.

Summary of urine examinations.

Urines were centrifuged before examination except in the case of those obtained in Mlanje district; forty-eight of the specimens from that area contained blood microscopically—probably due to infection with *S. haematobium*—but in the absence of ova, these have not been included in the following figures.

	Number examined First age-group 361					Number examined Second age-group 1,230							Number examined Third age-group 930				
	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba	Chiradzulu	Cholo	Ft. Johnston	Karonga	Kota-Kota	Mlanje	Zomba	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba
Number examined per district ...	87	200	4	59	11	200	267	200	6	200	263	94	281	200	37	359	53
Number positive: *S. haematobium*	2	9	—	14	4	134	34	21	1	162	134	43	63	49	9	114	27
Percentage positive per district	2.3	4.5	—	23.7	36.3	67	12.7	10.5	13.3	81	50.9	45.7	22.4	24.5	24.3	31.7	50.9
Percentage positive per age-group	8					43							28				

District Group B.

	Number examined First age-group 50					Number examined Second age-group 224					Number examined Third age-group 391				
	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu
Number examined per district ...	12	11	—	—	27	11	49	—	100	64	61	106	—	100	124
Number positive: *S. haematobium* ...	—	—	—	—	1	—	—	—	9	9	—	2	—	6	8
Percentage positive per district ...	—	—	—	—	3.7	—	—	—	9	14	—	1.9	—	6	6.5

Specimens of urine were not obtainable in Fort Manning district owing to local superstition and—to some extent—false modesty. In course of time, as the population becomes accustomed to requests for this material it is anticipated that these factors will cease to be a hinderance to the completion of surveys.

According to the figures submitted, the incidence of urinary schistosomiasis in "District Group B" is trifling as compared with the prevalence of this disease in district comprising "District Group A."

TABLE VI.

Summary of stools examinations.

Two simple smear preparations were examined from each specimen as a more elaborate technique is not possible under survey conditions.

District Group A.

	Number examined First age-group 369					Number examined Second age-group 1,242							Number examined Third age-group 937				
	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba	Chiradzulu	Cholo	Ft. Johnston	Karonga	Kota-Kota	Mlanje	Zomba	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba
Number examined per district ...	87	200	4	63	15	200	267	200	6	200	271	98	281	200	37	366	53
Number positive:																	
(1) Hookworm ova ...	3	38	1	4	1	75	30	54	3	124	14	9	44	69	19	27	16
(2) Ascaris ova.	16	—	—	10	5	49	60	—	—	2	56	24	7	—	—	62	10
(3) Hookworm and ascaris ova ...	14	—	—	—	—	—	166	—	—	—	6	1	197	—	—	10	—
(4) Hookworm and *S. mansoni* ova ...	—	—	—	1	—	—	—	—	—	3	—	—	7	—	—	1	—
(5) Hookworm, ascaris and *S. mansoni* ova	—	—	—	1	—	—	—	—	—	—	—	—	13	—	—	2	—
(6) *S. mansoni* ova ...	—	—	—	1	—	—	—	—	—	11	13	11	—	7	2	26	2
(7) Ascaris and *S. mansoni* ova	—	—	—	—	—	—	—	—	—	—	5	—	—	—	—	8	—
(8) *T. solium* ...	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—
(9) Other intestinal parasites	—	—	—	—	—	2	—	—	—	2	1	6	—	—	—	2	—
Percentage of specimens positive per district	37.9	19	25	27	44	63.5	95.8	27	50	71	34.8	52	95.3	38	60	37.7	54
Percentage of specimens positive per age-group	25.7					58.6							56.7				

District Group B.

	Number examined First age-group 87					Number examined Second age-group 210					Number examined Third age-group 350				
	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu
Number examined per district	12	8	29	11	27	11	38	76	21	64	66	78	57	25	124
Number positive:															
(1) Hookworm ova ...	1	—	3	—	—	4	3	3	—	—	12	9	15	8	—
(2) Ascaris ova ...	—	1	—	5	5	—	7	—	9	9	—	11	—	5	8
(3) Hookworm and ascaris ova ...	—	—	—	—	—	—	—	—	—	14	—	—	—	—	19
(4) Tapeworm ova ...	—	—	—	—	—	—	—	—	—	—	—	2	—	—	—
(5) *E. histolytica* ...	—	—	—	—	—	—	8	—	—	—	—	18	—	—	—
(6) Other intestinal parasites	—	—	—	—	—	—	—	9	2	—	—	—	2	1	—
Percentage of specimens positive per district ...	8.3	12.5	10	45.4	18.5	33	47.6	15.7	52.3	36	18	64	30	56	21.7
Percentage of specimens positive per age-group	17.3					32.3					31.7				

It is obvious that the present hospital and dispensary system—extensive though it may be—barely touches, as yet, the fringe of the medical requirements of the country. In Table VI of the Annual Medical Report, 677 cases of ascaris infection are recorded. The number of occasions the eggs of this helminth were found either alone or in combination with others during medical surveys exceeds that figure. Records of surveys are not included in the return of diseases from hospitals and dispensaries and in most instances the latter gives a slight indication only of the prevalence of disease throughout the country.

That village sanitation is in a deplorable state is fully borne out by Tables V and VI of this report. It is impossible to estimate what percentage of infantile mortality is due to helminthic diseases but these conditions must render young children more susceptible to illness of a more serious nature.

In one group of villages in Mlanje district where helminthic and protozoal diseases did not exceed to any great extent, the average percentage of these diseases for the combined districts and sanitary conditions were comparatively satisfactory, it was found that 182 mothers had lost between them 379 infants. What is the state of thosesurviving to the second age-group? 50.9 per cent. with urinary schistomiasis and 35 per cent. with hookworm and/or ascaris infections, many probably with all three and malaria superimposed at intervals. Yet these diseases are preventable.

TABLE VII.

Thick and thin films were prepared, the majority of the slides obtained being sent to the Pathologist, Zomba, for examination. Parasites when found in thick films only are recorded as undefined.

District Group A.

	Number examined First age-group 420					Number examined Second age-group 1,263							Number examined Third age-group 962				
	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba	Chiradzulu	Cholo	Ft. Johnston	Karonga	Kota-Kota	Mlanje	Zomba	Cholo	Ft. Johnston	Karonga	Mlanje	Zomba
Number examined per district	87	200	4	78	51	200	267	200	6	200	284	106	281	200	37	381	63
Number positive:																	
(1) Malaria undefined ...	1	16	—	—	—	37	2	23	—	69	—	4	3	14	—	—	—
(2) *P. falciparum*	19	5	2	21	27	—	66	22	2	31	97	49	52	13	3	94	8
(3) *P. vivax* ...	6	—	—	6	6	—	19	2	—	6	20	—	12	2	1	21	—
(4) *P. malariae*	1	—	1	2	5	—	4	4	—	19	—	11	2	5	1	2	1
(5) *P. falciparum and P. vivax*	—	—	—	1	2	—	1	—	—	—	1	—	1	—	—	2	2
(6) *P. falciparum and P. malariae* ...	1	—	—	—	4	—	—	—	—	1	—	—	—	—	—	—	—
Percentage of blood films positive per district ...	32	10.5	75	38.4	86.2	18.5	34.4	25.5	33	62.5	41.5	61.3	24.8	17	13.5	31.4	17.4
Percentage positive per age—group ...	30					38.7							24.8				

District Group B.

	Number examined First age-group 138					Number examined Second age-group 313					Number exanined Third age-group 516				
	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu	Dedza	Lilongwe	Ft. Manning	Mzimba	Kasungu
Number examined per district	12	40	8	51	27	11	98	83	57	64	63	182	47	100	124
Number positive:															
(1) Malaria undefined ...	—	12	3	12	7	—	3	27	9	21	—	2	12	8	29
(2) *P. falciparum* ...	1	6	2	16	—	3	29	9	21	—	7	53	8	18	—
(3) *P. vivax*	—	1	—	1	—	—	14	—	1	—	—	14	—	1	—
(4) *P. malariae* ...	—	—	—	—	—	—	1	—	—	—	—	4	—	—	—
Percentage of blood films positive per district ...	8.3	47.5	62.5	56.8	26	27	56	43.3	54.3	32.6	11	40	42.5	27	23.4
Percentage positive per age-group	44.2					41.5					30				

During the examination of blood films collected in the course of the survey in Mzimba district, the spironema of relapsing fever was found on six occasions.

CLINICAL EXAMINATION.

Apart from the helminthic and protozoal diseases summarised in the above Tables, clinical examinations did not reveal a serious prevalence of any other important diseases.

Affections of the skin—mainly scabies, eczema and impetigo—are common to all age-groups, the rate varying from 10% to 25%.

Minor disorders of the digestive and respiratory tracts were frequently complained of; only two cases of pulmonary tuberculosis—confirmed by sputum examination—are recorded in the series.

With the exception of umbilical hernia, physical defects or deformities are rare. One case of deaf mutism was seen; two cases of cleft palate and one of deformity of the chest were recorded.

In Cholo district, umbilical hernia was found in 18% of children in the first and second age-groups. It is considered that too early or forceable removal of the cord, followed by sepsis are predisposing factors. That the condition rarely persists after puberty is confirmed by the fact that it was present in only 1.3% of the third age-group.

Reports on the state of nutrition varied considerably. It is difficult to lay down a working standard for assessing this state, furthermore, all surveys were not held during the same months. From some districts reports were received that food supplies were low, particularly in those areas where the maize crop had produced a smaller yield than usual; no cases of actual starvation are recorded.

(III) School Hygiene.

(*a*) *African Schools.*

The medical examination of African pupils was introduced during the year at the following schools:—

(1) Church of Scotland Mission School, Zomba.
(2) The Roman Catholic Mission School, Blantyre.
(3) The Providence Girls' School, Mlanje.
(4) Central School, Livingstonia Mission, Karonga.

For the purpose of standardising the extent and nature of the examinations, printed forms of the type generally used in connection with school medical inspections were issued to medical officers conducting the investigations. These forms will be retained at the district hospitals for insertion of the results of the annual examinations; in the event of the death of a pupil or on his or her departure from school they will be forwarded to Medical Headquarters. Thus, a permanent record of the physical state of each pupil during school life will be obtained.

It will be observed from the summary of one of these reports that the average age of the pupils of the most junior class is considerably higher than that of a class of the same standard in an English school; furthermore the extremes of age met with in the classes are not likely to be experienced in educational circles in Europe.

Education in Nyasaland is not compulsory and the age at entry to vernacular schools may range from 6 to 16 years. Should normal educational progress be retarded owing to illness, lack of interest or for economic reasons, the pupil may be aged from 13 to 21 years before commencing the study of English.

That the designation "school child" is a misnomer when applied to the older though not necessarily the more advanced pupils is evident by the following Table (Table I) summarising the information obtained during the examinations performed by the Medical Officer, Zomba. Altogether 295 pupils were examined and from these were obtained 263 blood films and 180 specimens of urine and of faeces.

TABLE I.

					Sub-standard					
Class reference	1st	2nd	3rd	4th	A	B	IA	IB	II	III
Number of pupils in each class	65	37	36	32	30	28	18	18	14	17
Average age of pupils in class	11.2	13.1	14.5	16	16.4	17.1	17.7	17.8	20.5	21.5
Minimum and maximum ages	6-18	8-19	8-21	11-21	10-21	12-20	15-21	12-22	16-25	16-26
Average height in class	4' 5"	4' 6"	4' 7"	4' 10"	5' 2"	5' 2"	5' 3"	5' 2"	5' 4"	5' 5"
Average weight in class [in lbs.]	67	69.2	82.6	92	109.6	101.1	117.9	107	129	123

In view of the differences in age met with, the findings are tabulated below, not on a class but on an age basis. Blood, urine and stool examinations are recorded as the number positive out of the total examined at each age.

Number examined	8	3	9	9	12	15	21	20	15	31	36	21	33	17	18	27
Age—years	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21 & over
Average height	3' 11"	3' 11"	4' 1"	4' 1"	4' 3½"	4' 4"	4' 5"	4' 8¼"	4' 8⅖"	4' 10¼"	5' 1"	5' 1⅔"	5' 2½"	5' 4"	5' 4⅔"	5' 5⅔"
Maximum height	4' 5"	4' 3"	4' 6"	4' 5"	4' 9"	4' 8"	5' 0"	5' 1"	5' 4"	5' 5"	5' 9"	5' 11"	5' 8"	5' 8"	5' 10"	5' 10"
Miminum height	3' 0"	3' 8"	3' 8"	3' 11"	4' 0"	4' 0"	4' 0"	4' 5"	4' 0"	4' 4"	4' 7"	5' 0"	4' 11"	4' 10"	5' 1"	4' 11"
Average weight—lbs.	51.4	52	54	56.6	63.5	64	71.5	78.1	78.3	89.1	99	110.5	109	112.9	118.4	126.6
Maximum weight	58	57	72	66	86	76	103	120	111	121	126	136	140	138	143	154
Minimum weight	44	47	42	47	49	52	57	62	57	63	72	96	69	83	86	75
Average Hb%	74	73	69	72	72	69	71	74	78	73	77	75	71	74	73	73
Number of blood films examined ...	8	3	9	9	11	14	19	17	12	27	32	19	27	16	13	27
Number of blood films positive																
P. falciparum	3	1	5	1	5	4	4	4	3	6	4	4	4	6	1	7
P. vivax	–	—	—	1	1	—	—	1	—	—	1	—	—	—	—	—
P. malariae	2	—	—	—	—	—	1	—	—	—	1	—	—	—	—	—
Number of stools examined	—	3	6	4	8	8	9	11	9	18	26	11	22	11	13	21
Number positive for hookworm ova ...	—	2	3	1	2	2	2	6	3	8	10	3	12	3	4	9
Ascaris ova	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—
S. mansoni ova	—	—	—	—	—	—	—	—	—	—	—	1	1	—	—	—
Number of urines examined	3	2	5	1	9	7	10	12	8	20	23	13	29	6	15	17
Number positive for *S. haematobium* ...	—	—	—	—	1	3	3	3	3	2	7	1	6	1	7	4
Enlarged or infected tonsils	100%	100%	88%	77%	100%	93%	95%	95%	73%	80%	77%	85%	70%	82%	77%	81%
Dental caries	12.5%	—	—	22%	16.6%	26%	—	—	—	—	2.7%	4.7	—	—	—	11%
Pyorrhoea	—	—	—	—	—	—	14.5%	5%	6%	6.4%	11%	—	—	—	—	—
Skin diseases	25%	100%	44%	—	8%	33%	14%	10%	20%	30%	25%	20%	24%	16%	22%	18%

In his report the Medical Officer, Zomba, states "The outstanding feature of the examination is the very high percentage of enlarged or infected tonsils seen. In no case could a history or complaint of sore throat be elicited even in cases where the tonsils resembled raw beef and were covered with a purulent exudate.

Scabies is the most common skin condition met with. It appears to cause little or no discomfort to those infected."

The spleen rate of children under 10 years of age is only 10%, considerably lower than anticipated.

So far as I am aware, a table of average heights and weights of Africans has not yet been compiled. A comparison of the averages recorded above with a table of English averages shows little or no difference during the years of childhood. As adolescence approaches, the African drops below the European standard, the difference in weight being much more obvious than the difference in height.

Investigations on a much wider scale are required before an African or even a Nyasaland standard of averages can be arrived at. At present, in only a limited number of cases is it possible to obtain confirmation of the age of a native, and until such times as birth certification and registration become general, accurate statistics referable to age will be unobtainable.

2. THE ROMAN CATHOLIC MISSION SCHOOL, BLANTYRE.

This establishment is a mixed day and boarding school but only those pupils permanently in residence, numbering 66 were examined by the Medical Officer, Blantyre. In his covering report, it is stated that:

"The school is well built with adequate light, ventilation and floor space and a pipe-borne water supply."

"The diet of the boarders consists of maize as a basis to which beans, groundnuts, fruit and vegetables are added when obtainable."

The averages age of the pupils was 17.06 years. Only 9 or 13.5% were completely free from disease; the following conditions prevailed among the remainder:—

Skin	Scabies 33%. Tinea 1.5%. Impetigo 1.5%.
Tonsil	Enlarged 4.5%.
Ears	Otitis media 3%.
Abdomen	Umbilical hernia 7.7%.
Circulatory System.	One case of a double mitral lesion was discovered.

Deformities and other diseases:

Naevus	1
Kyphosis	1
Chronic Bright's diseases	1

Stool examination revealed a high incidence of ankylostomiasis to the extent of 55%. No other helminths were found.

Haemoglobin estimations were not made. Blood films on examination were found to contain malaria parasites in the following percentages:—

P. falciparum	3.0%
P. vivax	4.5%
P. malaria	4.5%

Although specimens of urine were not centrifuged, 7.5% were found to contain ova of *S. haematobium*.

All students were weighed and measured. In a reference to this part of the examination the Medical Officer states:

"My attention was arrested by the contrast between the average weights and heights determined for these students compared with those given for European children by McCaw. The ages recorded during the investigation were checked with the baptismal registers and can be relied upon as accurate. The following table (Table II) is appended in order that comparison can be made.

TABLE II.

Age	Height		Weight	
	Average of European school children	Average of Native school children, Blantyre	Average of European school children	Average of Native school children, Blantyre
11 years	4′ 5″	4′ 3″	72 lbs.	56½ lbs.
13 years	4′ 9″	4′ 5″	88½ lbs.	58½ lbs.
14 years	4′ 11	4′ 6″	109 lbs.	59 lbs.
15 years	5′ 2½	4′ 9″	111 lbs.	74½ lbs.
16 years	5′ 4¾	5′ 0″	123½ lbs.	86 lbs.

African children are certainly smaller than European children of the same age but the difference in weight is very noticeable. This stunted growth is as far as I can see, not associated with any other signs of vitamin deficiency and is just as evident in those free from helminths as those infected. I attribute it to lack of the protein elements in food necessary for growth ".

3. THE PROVIDENCE GIRLS' SCHOOL, MLANJE.

This is the only institute solely for education of African females coming within the scope of the school medical inspection.

In his covering report, the Medical Officer, Mlanje, states:

" The general standard of health was good; it must however be borne in mind that all these children are specially selected by the mission authorities and in many cases are the offspring of mission-trained parents.

During the inpection, the school buildings, washing, bathing and other sanitary arrangements were scrutinised; all were in a highly satisfactory state.

Regular hours, a well balanced dietary and a sufficiency of out-door exercise under constant European supervision explain the general state of well-being and contentment ".

The variations in age met with in the different classes at the boys school in Zomba occur also at this school for girls, and no useful purpose would be served by tabulating the results on a " class " basis.

In the following Table, (Table III) the findings are summarised according to age though in several instances the numbers examined are too small to permit of comment on the results.

That a state of well-being exists so far as mere nutrition is concerned is borne out by a reference to the average weights of the pupils. Girls of 12, 13 and 14 years of age who form the majority of the children examined have average heights and weights equal to if not greater than the averages for English children of the same age. This too, although many of these African children are harbouring such parasites as malaria, hookworm, ascaris and *S. haematobium*. One child aged 13 years had all four parasites in addition to *S. mansoni*.

TABLE III.

Number examined	1	1	1	16	38	39	25	11	5	1	1
Age—years	5	7	8	10	11	12	13	14	15	17	21
Average height	3′ 9″	3′ 8″	3′ 8″	4′ 0¼″	4′ 3½″	4′ 6½″	4′ 9¾″	4′ 11″	5′ 0⅖″	4′ 6″	4′ 5″
Maximum height	—	—	—	4′ 4″	4′ 11″	5′ 0″	5′ 2″	5′ 2″	5′ 3½″	—	—
Minimum height	—	—	—	3′ 7″	3′ 10″	4′ 1″	4′ 5″	4′ 9″	4′ 10″	—	—
Average weight—lbs. ...	63	53	50	57.5	64.2	77.9	94.2	104.2	120.4	99	80
Maximum weight	—	—	—	77	84	105	120	135	135	—	—
Minimum weight	—	—	—	45	50	58	70	80	105	—	—
Number of blood films, urines, and stools examined ...	1	1	1	16	38	39	25	11	5	1	1
Number of blood films positive :											
P. falciparum	1	—	—	4	12	8	7	1	3	—	—
P. vivax	—	—	—	3	4	3	4	—	—	—	—
P. malariae	—	1	—	—	—	—	—	—	—	—	—
Gametocytes—Crescents ...	—	—	—	2	—	—	—	—	—	—	—
Number of stools positive :											
Hookworm ova	—	—	—	1	1	1	3	1	—	—	—
Ascaris ova	1	1	1	4	15	15	6	3	1	1	—
S. mansoni ova	—	—	—	—	—	—	1	—	—	—	—
Hookworm, ascaris and *S. mansoni* ova	—	—	—	—	—	—	1	—	—	—	—
Number of urines positive for *S. haematobium* ...	—	—	—	3	11	8	7	—	—	—	—

Five of the nineteen children aged 10 years or less had enlarged spleens. As the result of an injury in childhood, the 21 years old pupil was confined to bed for 6 years and has only recently commenced school. She has a well marked curvature of the spine in the thoracic region and is below the average weight and height of children many years her junior.

Enlargement of the tonsils was prevalent. In the 10, 11, 12, 13 and 14 years old children, that condition was found in 33%, 18%, 12%, 28% and 18% respectively.

Skin conditions were comparatively rare only five cases of tinea and one of impetigo being reported.

One child whose mother is a leper is being kept under observation and another pupil with early clinical signs of pulmonary tuberculosis is being watched carefully.

4. CENTRAL SCHOOL, LIVINGSTONIA MISSION, KARONGA.

This institution, situated close to the administrative centre of the district is a combined day and boarding school for male and female students. During recent years the school surroundings have become less healthy as the rising waters of Lake Nyasa have interfered seriously with the drainage of the area.

The resident students are representative of every section of the district and their physical state may therefore be regarded as typical of conditions prevailing among the general native population of that part of the Protectorate.

The examination of 263 pupils revealed that a considerable number of them suffer from diseases due to helminthic and/or protozoal infections, consequently, ill-health is prevalent.

The following Table (Table IV) summarises the results of the examination of 237 male pupils.

TABLE IV.

Number examined	4	11	11	28	27	27	35	23	28	43
Age—years	12	13	14	15	16	17	18	19	20	21 & over
Average height	4′ 6″	4′ 9″	4′ 10½″	5′ 1⅔″	5′ 2″	5′ 4″	5′ 4¾″	5′ 4½″	5′ 5½″	5′ 5½″
Maximum height	4′ 6″	4′ 11″	5′ 5″	5′ 7″	5′ 7½″	5′ 7½″	5′ 10½″	5′ 10″	5′ 9″	5′ 10″
Minimum height	4′ 6″	4′ 7″	4′ 5″	4′ 8″	4′ 11″	4′ 10″	4′ 11½″	4′ 9½″	5′ 4″	5′ 1″
Average weight—lbs. ...	68	64.4	77	83.3	93.5	104.5	118.5	101	128.5	126
Maximum weight ...	80	78	91	118	124	127	140	137	146	146
Minimum weight	60	52	63	60	65	67	88	59	108	107
Average Hb%	55	67	64.5	65	69	65.4	68	67	70	70
Number of blood films positive :										
P. falciparum	1	2	3	3	3	4	12	3	3	9
P vivax	—	—	1	5	2	4	4	—	4	7
P. malariae	1	—	—	2	4	3	2	1	1	1
Number of stools positive for Hookworm ova	1	1	1	12	8	13	11	11	13	14
Hookworm and *S. mansoni* ova	1	6	2	4	7	4	6	3	2	7
Hookworm and ascaris ova ...	—	—	—	—	—	1	1	1	—	1
Hookworm, ascaris and *S. mansoni* ova	—	1	—	3	1	—	—	—	—	--
S. mansoni ova	—	—	—	—	--	1	3	—	1	2
S. mansoni and ascaris ova ...	—	—	—	1	—	—	1	—	—	—
Ascaris ova	—	—	—	—	1	—	—	—	—	—
Tapeworm ova	—	—	—	1	—	—	—	—	1	—
Number of urines positive for *S. haematobium*	3	6	7	11	16	14	12	9	10	20
Number with enlargement of spleen	4	7	10	25	25	24	28	19	22	31
Number with enlargement of liver	4	7	8	15	21	13	21	13	13	28

The ages of the 26 female students examined ranged from 11 to 18 years and as the number inspected is comparatively small, the results are given briefly in the following Table (Table V) ;

TABLE V.

Number of female pupils examined	26
Average haemoglobin	66%
Number of stools positive for hookwom ova	6
,, ,, ,, ,, ,, *S. mansoni* ova	2
,, ,, ,, ,, ,, *S. mansoni* and hookworm ova ...	6
Number of blood films positive for *P. falciparum*	5
,, ,, ,, ,, ,, ,, *P. vivax*	2
,, ,, ,, ,, ,, ,, *P. malariae*	2
Number of urines positive for *S. haematobium*	8
Number with enlargement of the spleen	24
,, ,, ,, ,, ,, liver	14

(*b*) EUROPEAN SCHOOLS.

There are two European schools in the country, one a mixed boarding and day school and the other a small day school. The schools are inspected by the Medical Department twice a year, the total number of pupils examined being 16 boys and 40 girls, their ages varied from 4—14 years.

The numbers are too small to furnish any useful statistics, careful records are kept of weights and heights and generally speaking these compare very favourably with standard.

The parents' attention is called to any defects disclosed by medical examination.

(IV) Labour Conditions.

An unsatisfactory state of affairs has been disclosed by the publication of the Report of the Committee appointed to enquire into Emigrant Labour, in this Report it is computed that some 120,000 adult male natives are absent from the Protectorate. This number represents about a quarter of the total adult male population.

The effects on the family and on the community are of course disastrous, the whole social fabric of the village is in danger of being undermined and destroyed.

It is at the present time impossible to obtain statistics of health in relation to returning emigrants, but an analysis of 143 cases of invalid repatriates returned to Nyasaland from Southern Rhodesia, makes disquieting reading:—

Total	Fracture of limbs and injuries	Mentally deficient. Insanity (cured)? Epilepsy	Tuberculosis	Venereal	Arthritis and Osteomyelitis	Elephantiasis	Blind, Deaf or Dumb.
143	32	26	12	5	7	4	8
Percentage	22.3	18	8.3	3.4	4.8	2.7	5.5

Employed Labour.

Some investigations were made during the year into the conditions under which labour is employed on estates.

Very little time could be devoted to this most important branch of work, but, generally speaking conditions were found to be rather unsatisfactory.

Housing of a temporary nature is usually provided by the labour itself, the usual custom being to allow each boy two days to build his house. The result more often than not, is a collection of poorly built huts which show no economic value and hardly constitute an improvement to the estate.

At each inspection or visit, the importance of adequate housing, clean water supplies and the provision of the essential sanitary requirements is pointed out, advice and assistance in choosing sites for housing and on the care and medical attention of labour is also given.

Simple drugs and dressings are sold by the Medical Department at cost price to *bona fide* planters.

(V) Housing and Town Planning.

Mention has already been made under Section III. B of the work of village reconstruction which is being gradually undertaken in certain rural areas.

There is no doubt that the efforts of propaganda carried out both by the officers of this Department and by the Jeanes' school, are having a definite and visible effect on village sanitation and it is satisfactory to record that progress is being made.

At Zomba a model village consisting at present of wattle and daub houses, carefully planned and constructed has already served a useful purpose and has accommodated a considerable number of women and children who previously occupied quarters in European compounds much to the detriment of the public health.

The establishment of such locations is proceeding at both Limbe and Blantyre and the ultimate aim of permanently built locations has not been lost sight of.

(VI) Food in Relation to Health and Diseases.

It is significant to read that even at the state of civilization and development reached by European nations it is considered that the ideal diet necessary for health has still to be determined, and that a definite policy for nutrition is still required.

In particular the advantages of milk as an ideal diet have been stressed and proposals have been formulated for the supply of cheap or free milk to school children.

In this country, although there is a large variety of native foodstuffs and food shortage does not occur to any considerable extent, there is evidence that a proportion of the native population is on the verge of deficiency disease, cases of pellagra occur throughout the country, beriberi has been recognised, scurvy or a condition akin to scurvy has been noticed and as more than one medical officer has remarked there is, during the planting seasons and consequently at the time when food shortage is likely to occur an enormous increase of patients with catarrhal conditions attending the out-patient departments, evidence possibly of a lack of the essential protective vitamin A.

Proposals have been made to stimulate the cattle industry in some of the Northern districts by providing a market for the sale of milk, the milk so obtained being given as a free issue to children of school age. An interesting experiment from which developments may be expected—the experiment will commence in 1936.

The introduction of markets and the provision of slaughter houses have to some extent fostered the sale of meat and the trade in cattle.

Meat has been introduced into the full dietary of all native hospitals.

B. MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

A series of articles dealing with the prevention of disease and the preservation of health has been prepared by the Department, translated into Chinyanja and published in the vernacular newspaper called 'Zoona.'

So far six articles have appeared, the main subjects dealt with, being :—

(I) Cleanliness and good health.
(II) Food protection.
(III) Hut hygiene.
(IV) Rats, plague and grain stores,
(V) Latrines and their use.
(VI) Worms, prevention and cure.

AGRICULTURAL SHOW.

A health exhibit, intended primarily for propaganda purposes, was held during the Agricultural Show for the first time and achieved a considerable amount of success. The exhibit consisted of three sections :—

(1) Hospital (2) Public Health and (3) Infant Welfare.

(i) The hospital exhibit staged a completely equipped bed with bedside locker, plate, mug and feeding cup, also a table with a simple first aid outfit.

(ii) The child-welfare section was in charge of the nursing sister from the Jeanes' centre, a simple cot made from a native tobacco basket, weighing scales and diagrams of standard diets and weights for infants were shown.

(iii) The Public Health exhibit consisted of :—

(I) Models displaying,
  (*a*) Village water supplies,
  (*b*) European compound with servants quarters,
  (*c*) Clean and dirty native compounds,
  (*d*) Model village,
  (*e*) Model native houses.

(II) Full size specimens of a native latrine top, pit cover with flytrap. "Four Oak" sprayers and a model of a rat-proof grain store.

(III) Posters illustrating health propaganda.

The Laboratory exhibited blood slides of malaria with large explanatory diagrams. Mounted specimens of ticks and mosquitoes were also displayed.

Active health propaganda was continued in rural areas by medical officers and sub-assistant surgeons, a few extracts from the district annual reports are quoted :—

MLANJE.

A complete reconstruction of a village on the lines of the Jeanes' centre was effected at the request of one of the principal headmen.

The headman was evidentally of a progressive nature as he held a very good agricultural show and awarded a prize to the best kept of some 37 villages, the local sanitary inspector acting as judge.

An extract from the Annual Report reads :—

"On my monthly inspections the sanitary inspector (*native*) accompanies me, we discuss with the headman the question of the sanitary improvement of his village and where constructional work is to be undertaken, the sanitary inspector remains behind for a few days to supervise and assist.

At medical surveys the futility of living in a continual state of ill-health was impressed upon the general public. Every effort was made to prove to them that fully 80% of their illnesses were due to preventable causes, (helminth infections).

The methods of prophylaxis against these, the endemic diseases of the country, were fully explained."

The methods adopted for the "improvement of village life" are simple and are easily carried out by the poorest, the recommendations of the medical officer generally include the following measures :—

"(I) A general clearing and cleaning of the immediate surroundings of huts and villages. The prohibition of tall crops near houses.

(II) The erection of all new huts to a standard construction, well aligned and properly sited. The Jeanes' school village near Zomba is taken as a model.

(III) The provision of deep pit latrines, one to each hut as far as possible, lids of plaited reeds to be used where wood for covers is not obtainable.

(IV) The provision of refuse pits, the contents of which will be valuable for manure.

(V) The stoning and clearing of washing and bathing places, the protection of water supplies from contamination.

(VI) Provision of burial grounds, not near to water supplies."

KARONGA.

Evidence that the preaching of the gospel of hygiene is having an effect is produced by the following quotations taken from a letter written by one of the chiefs to the medical officer.

"............I am going to employ sanitary inspectors being paid by Native Authority money.

They will have to enforce people for latterines in the villages and make the people to clean the villages and dig the pits to throw the refuse therein, to stop flies infections. I am going to inform the inspectors that in the villages when they see the women those are pregnants under six or seven months should be told to come to the hospital for treatment until birth time takes place. The reason because the population is being decreased by having deaths yearly many women having died through pregnants owing to being unable to come to hospital when in family way.........if the women would be brought to clinic hospital I do not think deaths should occur so often.........I am going to order good lines when village is being formed up and good sweeping.

Here is another disease.........which is enlarging now in this country which is called tuberculosis............".

The hospital referred to by the Chief is a small native hospital of 50 beds with a medical officer, but with no European Sisters and with *one partially trained native female attendant only*, nevertheless seventeen maternity cases were dealt with at the hospital, two of these were severe ante-partum haemorrhage, three were cases of delayed labour necessitating forceps, one was a lateral placenta praevia, two were abortions and one uterine inertia, the remainder were cases of delayed labour requiring no mechanical assistance. A striking example of the difficulties normally encountered in a small native district and an urgent denial of the theory that under normal conditions child birth amongst primitive races is a comparatively easy process, and a passionate plea for the further provision of medical services.

FORT JOHNSTON. An extract from the Annual Report is quoted:—

"Measures taken to instruct the natives in Hygiene.

1. This aspect of medical work has occupied much of our attention during the year. Our efforts have met with considerable success, as is shown by the fact that towards the end of the year we attended initiation ceremonies and circumcised a number of boys in accordance with native custom.

2. Reference may be made to the demonstrations and lectures given during the course of medical surveys and medical camps...............simple health rules have been demonstrated over the greater part of the district.

3. Demonstration latrines were erected at Mponda and Nsumbi villages and at the dispensaries Kukalanga and Namwera, in the compound of the Marine Transport Department and in the Police Lines.

The reason for disposing of excreta in this way was explained. The transmission of hookworm was referred to in particular and since the success attending the treatment of this disease is already appreciated, reference to treatment *en masse* aroused interest.

4. The District Commissioner decided to rebuild Nsumbi village. Our co-operation being requested, the opportunity was seized of securing a village built on recognised sanitary lines, which other natives might envy and therefore copy. The village is completed. It is wind swept and sun dried, so dirt cannot be harboured in it. Each hut has it's own compound enclosing a kitchen and *nkokwe* (grain store). Huts are arranged, not in draught board pattern, but in lines so disposed as to avoid monotony, at the same time, the compactness of the village as a whole is preserved.

During construction, the reasons for employing simple health laws in the lay-out were constantly emphasized and the need for latrines insisted upon. A medical camp visited the village on several occasions so that the benefits of medical treatment might be appreciated at the same time as sanitary lessons were being learnt".

The methods outlined above for the spread of hygiene and sanitation were those adopted by the European medical officers of the Department, in contrast it is of interest to dip into the annual report of one of the Indian sub-assistant surgeons, from which it is clear that equal interest is displayed in social improvement.

Some of the native customs in respect of death and treatment of disease are described and it would appear that in certain tribes (the Achewa),

(i) If a woman dies the husband has to pay money or goats to the uncle or brother of the wife.

(ii) If a child dies the father has to pay money or goats to the uncle or brother of his wife.

(iii) The husband has to ask permission from the uncle or brother of his wife if he wishes to send her to the hospital for treatment.

(iv) The father has to ask permission of the uncle or brother of his wife if he wants to send his children for treatment to hospital.

As may be imagined the consequences of these customs are disastrous and many avoidable deaths occur from refusals or from the absence from the village of the responsible party at the critical period.

As a result of conversations the Sub-Assistant Surgeon and the District Commissioner succeeded in getting the customs amended to the extent of allowing:—

(i) a woman in difficult labour to be sent to the hospital, and

(ii) provision to be made for the punishment of any person who knowingly spreads venereal disease.

Dealing with the habits of the natives the sub-assistant surgeon remarks that their semi-nomad life and their destructive habits in cutting down forest and grass-burning are leading to an infertile state of the soil which becomes hard and baked and sandy. An endeavour is being made therefore to anchor the population by the improvement of village life, improved housing and sanitation and consequently improved methods of agriculture. He commenced by getting the natives to construct a model village, this proved so successful that within the year eleven other villages copied this example.

The model village was well laid out and each hut was supplied with a kitchen and a grain store, refuse pits, latrine pits, plantations, cattle kraals, and a school were all provided.

Other developmental work included the protection of springs, seventy have now been protected and two wells dug, and the provision of pit latrines and refuse pits. The sub-assistant surgeon goes on to describe how some years ago great difficulty was experienced in getting the natives to come in for treatment of hookworm, now the value of such treatment is recognised and it is possible to stipulate that before a district is visited for treatment purposes pit latrines shall be provided and that the village must be clean.

It need scarcely be said that the progress obtained in this district is due in no small measure to the close co-operation obtaining between the Administration and the Medical Department and to the enthusiasm of the officers themselves.

C. TRAINING OF AFRICAN PERSONNEL OF THE MEDICAL DEPARTMENT.

Considerable progress has been made with the training of dispensers or dressers for the Department during the year.

The aim is to turn out a reliable dresser fully competent to nurse the sick in a hospital and to run efficiently a small rural dispensary.

These dispensers are trained primarily in nursing and ward duties and are on probation until they have completed a course of practical instruction. During the probationary period they work full time in the hospital and before they can qualify for promotion are required to obtain a signed up card from the nursing sister in charge to the effect that they are proficient in these duties.

They are then taught simple dispensing, the recognition and treatment of the diseases considered suitable for treatment at a dispensary, simple clerical work, such as keeping the out-patient register and inventories, and methods of indenting for stores, etc.

The educational standard of the dresser has been raised and no boys under standard IV are now accepted.

The more highly trained subordinate staff, of the class of hospital assistant, is trained at the medical school at the Blantyre Mission Hospital, their curriculum of studies was given in last year's Annual Report.

During the year an attempt was made to instil more confidence and self reliance in the native sanitary inspectors. They were instructed not only to report errors of sanitation but where practicable to deal with nuisances on the spot, their work being checked up afterwards.

More sanitary inspectors are required for the improvement of village sanitation but an essential in any expansion in this direction is the provision in the first place of an additional sanitary superintendent who can supervise and teach them their work.

It is anticipated that with the collaboration of the Education Department it may be found possible to give each native sanitary inspector, during his training, a short course at the Jeanes' school, in order that they may obtain a definite bias for rural community work. The training of the African staff to a higher standard than that of hospital assistant has not yet been attempted, nor is it considered to be likely of accomplishment in such a small territory as Nyasaland. A large hospital with a full teaching staff is essential, the educational standard must be raised and possibly the solution is to be found in enlarging the scope of such an institution as Mulago in Uganda in order that students for higher training from the neighbouring territories may be received there.

Fully qualified African staff is urgently required to deal with problems of public health in this country and until such staff is available it is difficult to see how medical services can reach more than a small proportion of the native inhabitants.

Training of women is progressing slowly; native midwives are being trained at several mission centres. Native nurses are being trained at the African Hospital.

Native customs bar the way to progress and it is only by patient endeavour and education that any success can be anticipated.

D. RECOMMENDATIONS.

Government's policy has been directed at maintaining expenditure on health services at a steady level during the recent times of economic stress. A wise administration ensures that the promotion of economic development takes place along sound lines and realises that the prevention and cure of disease is an essential factor in progress. Even so far back as 1925 the East African Commission reported that:—

> "Northern Rhodesia, Nyasaland and Tanganyika Territory where the Imperial Treasury is still called upon to meet annual deficits and consequently has a determining voice in expenditure, do in fact lag behind Uganda and Kenya in respect of health services, and the steady improvemnt in the health of the natives in these territories must lead to a sharp contrast unless liberal provision is allowed for this work in the estimates of the others".

(1) In order that the health policy of this Protectorate may be fully appreciated, the aims and objects of the Medical Department are set forth in the following memorandum:—

It must be accepted as axiomatic that the health policy of any Government should be an integral part of the general policy of that Government.

Nyasaland is essentially an African territory, and the following extracts from the "Memorandum on Native Policy in East Africa" make it quite clear what the general principles of policy are, "..................it is the mission of Great Britain to work continuously for the training and education of the Africans towards a higher intellectual, moral and economic level than that which they had reached when the Crown assumed the responsibility for the administration of this territory"....................."it must be the aim of the administration of every territory with regard to all the inhabitants, irrespective of race and religion, to maintain order, to administer justice, to promote health and education and generally to promote the industrial and commercial development of the country"....................."it should aim at raising the average standard of knowledge and intelligence of the whole community, and achieving such an intellectual advance, as would, in itself, gradually effect a transformation of the daily lives of the people. Education, sanitation and a progressive raising of the economic standard of life should therefore go hand-in-hand".

The long series of legal enactments dealing with such things as work in factories, child labour, minimum wages, public health and so on have two main objects in view, i.e. to ensure that every individual shall have the opportunity of leading as healthy a life as possible from cradle to grave, and that when he enters the field of labour he shall work and live under the best possible conditions. In short it may be assumed as proven that the efficiency and therefore the material prosperity of a people depends to a very large extent on the healthiness of the people.

As a corollary to the above, applicable especially to primitive countries, it may be stated that the collaboration of several factors is necessary for success. Administration, Agriculture, Education, Forestry, Medicine, can none of them by themselves achieve results in any way comparable in value to those obtained by mutual co-operation. That this point is now receiving a wider appreciation is shown by, for instance, Sir Donald Cameron's memorandum on native policy, and the appointment of a Native Welfare Committee in Nyasaland.

The policy of the Medical Department is therefore based on three assumptions:—

(1) that a healthy environment for the individual is essential for the intellectual and material progress of a people,

(2) that a healthy environment, and intellectual and material progress can only be attained by close co-operation between those departments which directly serve the needs of the natives,

(3) that medical policy must be in consonance with the general policy of Government.

The conditions of the medical service and those which must shape its policy, are concerned chiefly with the native community, though of course from the aspect of preventive medicine all communities are concerned. This memorandum therefore deals mainly with medical service to the natives.

In all British African territories, medical services have become or are becoming public health services in the widest sense of that term, that is to say, that the therapeutic and preventive aspects of medicine are considered to be one and indivisible. For purposes of explanation, however, it will be convenient in this memorandum to deal with each in turn.

Therapeutic medicine includes the treatment of sick people, the provision and maintenance of hospitals and dispensaries, the supply of drugs, etc., and is an integral and essential part of the general work of the department. European staffs, however, are expensive and in order to extend medical facilities to as large a proportion of the population as possible, it is necessary to provide well educated, and well trained Africans. The training of Africans, therefore, becomes a problem of major importance with which the development of the country is intimately connected.

A supply of properly trained hospital assistants, dispensers, welfare workers, maternity nurses, sanitary inspectors, etc., must be ensured and it is the policy of the Department to co-operate with other departments of Government and with non-official institutions in the training of its African personnel ; for example, the hospital assistant grade is now being trained at a medical mission, the native midwife by various mission institutions, some of which are subsidised by Government, the dispenser grade, forming the bulk of the subordinate African staff of the Department, by the Department itself.

It is anticipated that in the near future a new grade, the welfare worker, whose work will be to promote the "development of village life in all it's aspects" may be trained at the Jeanes' school. As one of the principal aims of the Department is the provision of medical services throughout the country, all existing medical services should be mobilised and organized to form part of one comprehensive health scheme, so, therefore, it is the policy of the Department to develop any local services that already exist and are provided from non-Government sources and to expand such services by Government assistance in accordance with the needs of the population and in consonance with the approved policy of Government.

Considerable areas of the Protectorate are very inadequately provided with medical facilities and during the past few years appeals from district commissioners, medical officers and native authorities, have been constantly received requesting the provision of additional staff and dispensaries.

It is the policy of the Department to recommend that financial assistance, where necessary, should be provided for native authorities who are desirous and capable of developing their medical services and maintaining them.

Thus the Department aims at decentralizing both expenditure and service, that is to say that (1) instead of all medical services being paid for from the general revenue of the country, purely local service shall be paid for in part or wholly out of local revenue, and (2) instead of confining medical treatment chiefly to district hospitals, centres shall eventually be established in all rural areas in proportion to the needs of the population.

It is apparent that rural dispensaries under the existing system are inadequate not only in number, but in the quality of medical service which they are able to give. Therefore, if they are to fulfil their role, their scope must be extended, so as to include all the main features of an effective medical service, they must in fact become "Rural Health Units".

The staff of a "Rural Health Unit" will consist of a well-trained dispenser, a certificated mid-wife, and a sanitary inspector thoroughly trained in rural sanitary duties. Their headquarters will be a dispensary with wards of two to four beds attached, providing accommodation for cases awaiting transport to the district hospital or for hospital cases of a minor nature which can be dealt with locally. The mid-wife will be constantly visiting the people in their houses, educating women in the care of infants, giving pre-natal advice to expectant mothers and attending confinements. The sanitary inspector will keep in close-touch with the native authorities and with the welfare workers in his area and will regularly visit all the villages giving advice in hygiene and sanitation. The rural health units thus become the basis of a real public health service.

The medical council has recently introduced a syllabus of training for native midwives, and will register and grant certificates to such of them as succeed in passing the council examination. It is this type of woman who will be so useful at rural health centres.

Pari-passu with the progress of the rural health unit the district hospital will become a specialized treatment centre where exceptional medical and surgical facilities will be offered.

This secondary centre will be fed by patients from the primary centres or rural health units.

As a result of the evolution of this policy the administration of, and the treatment of the sick in the district hospitals will claim less of the time of medical officers and they will be enabled to devote their energies to the supervision of the public health of the districts as a whole, while collaborating with other department officers in raising the physical, intellectual and cultural standard of the native population.

Women and child-welfare work is of increasing importance in all countries and more especially in those inhabited by primitive people where the infantile mortality rate is terribly high. Two or three welfare clinics established at large centres, have a considerable local effect, but they cannot much affect the position in the country as a whole. On the other hand a well-equipped clinic is a comparatively expensive institution and cannot therefore be duplicated indefinitely. The difficulty is solved by the mid-wife of the rural health unit, who specialises in the care of the infant as well as carrying out the duties of a mid-wife.

The Medical Department is also concerned with the conditions under which immigrant and indigenous natives are employed on private estates. It is realized that economic conditions preclude the provision of amenities for labour such as exist in highly organized and wealthy industries, but it is hoped that by co-operation between employers and the department considerable improvement of existing conditions may be obtained.

With regard to non-natives, Government does not accept responsibility for providing hospital accommodation and medical attention for the non-official European community, yet it does in fact provide considerable facilities.

Two European hospitals exist and accommodate both officials and non-officials.

The fees charged to non-officials being much less than the cost of the treatment and of the medical and nursing attention provided.

Bona fide planters are assisted by Government by affording them the privilege of purchasing certain simple medicines from the Department at cost price.

Government medical officers and sub-assistant surgeons are allowed the privilege of private practice thus affording medical attention to non-officials and in certain districts much time is taken up in this branch of medical work to the possible detriment of the performance of official duties. In such districts it is the policy of Government to encourage private enterprise in the provision of private practitioners, and hospitals and dispensaries.

For the Asiatic community little has been done, but it is the policy of Government to subsidize medical missions providing hospital accommodation for Asiatics and at some of the African hospitals special accommodation is set apart.

(2) Hospitals.

(*a*) *European.* As pointed out in last year's annual report a definite saving of expenditure would be effected by the erection of one modern European hospital to take the place of the two rather inadequate units at Zomba and Blantyre respectively.

(*b*) *Native.* It is urgently necessary to provide clerical assistance for medical officers in charge of the larger hospitals. For public health reasons the provision of European nursing sisters and health visitors is an essential if the treatment of the women and children is to be adequately carried out and if the standard of nursing attention to the native patients is to be raised above its present very low level.

(3) Infant Welfare and Maternity Work.

Up-to-date clinics have been provided at three of the native hospitals in the Protectorate but cannot function as such as neither nursing sisters nor health staff are available. The appointment of a lady medical officer would allow the training of native midwives to be undertaken.

(4) Sanitation.

Unquestionably any real progress in village development and rural sanitation must depend to a large extent on the guidance and education in sanitary matters provided by the Medical Department. Unfortunately there are only two sanitary superintendents on the establishment and they are employed almost entirely in the larger townships of Limbe, Blantyre and Zomba.

In order to afford additional facilities by the way of advice and guidance in sanitary matters to the smaller townships, and to native rural areas, and in order to train native personnel the appointment of a third sanitary superintendent is required.

(5) Development of Rural Areas.

Much has been accomplished by medical officers touring their districts, by the efforts of the rural dispensers, by Jeanes' teachers and supervisors and by the natives themselves in the improvement and sanitation of villages, much more remains to be done. The proposals put forward in the annual report for 1934 for rural development have to a certain extent materialised, and there is now every prospect of the Jeanes' school being in a position to undertake the training of village welfare workers at an early date.

Such workers carefully selected and trained and employed in their proper sphere of action cannot fail to have an appreciable effect in raising the standard of village life.

The principal task of a welfare worker will be to guide the peasant into sanitary and hygienic ways, he will be resident in the village and must be acquainted with the precautions necessary to prevent the more common diseases, he should know how to dispose of night soil, manure and refuse, he should see that the children are vaccinated, that minor ailments and injuries get attended to without delay at the local dispensary, and for this purpose he should receive training in first aid, he should be able to give advice on the construction of a good type of house and to assist with the manufacture of doors and window shutters. He should be acquainted with methods for the protection of springs and for the provision of a good water supply.

He should have knowledge of the elementary principles of agriculture, the value of good seed, the rotation of crops and the protection and conservation of soil.

He should stress the value of forests and should encourage tree planting. He must know something of animal husbandry. He should keep a register of births and deaths.

Finally, by precept and example he must so order his own life as to be a guide, philosopher and friend for all the folk in the village.

Now it will be obvious that the welfare worker will not be able to do more than touch the fringe of all the problems of village life consequently it will still be necessary to have trained technical native staff available for carrying out the specialised duties of the dispenser, the sanitary inspector, the agricultural supervisor, the forest guard and the veterinary assistant.

Training and provision for all this technical staff is therefore essential.

(6) Medical Buildings.

The urgent requirements are : a new medical store, a new European hospital, a mental hospital.

(7) Training of Africans.

The provision of an European subordinate, preferably a R.A.M.C. sergeant, for training of African personnel and for the supervision of the African staff is an essential if the standard of the subordinate staff of the Departmental is to be put on an economic and efficient basis.

(8) Lunatic Asylum.

This institution under the executive control of the Chief Commissioner of Police and staffed by members of the Prison Department, does not *in any sense* fulfil its correct role of a mental hospital.

The treatment of mental diseases in the African warrants an institution controlled and staffed by the Medical Department, no other course is conceivable. A mental hospital is urgently required.

SECTION IV.

PORT HEALTH WORK AND ADMINISTRATION.

A camp was maintained during the year at Port Herald on the Beira—Blantyre railway for the quarantine of Natives or Asiatics entering Nyasaland who may be suffering from or been in contact with infectious disease or who were unable to produce the necessary certificate of vaccination.

The numbers so detained during the year were :—

	Men	Women	Children
Natives	64 ...	36 ...	47
Asiatics	Nil ...	Nil	Nil.

SECTION V.

MATERNITY AND CHILD WELFARE.

In the Annual Report for 1933 an endeavour was made to define, the main objects of an infant welfare centre, these were stated to be :—

(i) The maintenance of a good standard of health in the infants and young children of the district,

(ii) the education of the mothers,

(iii) the early detection of diseases,

(iv) the treatment of minor ailments.

It is necessary to have a clear view of this important branch of preventive medicine as the staff required by such a unit, even a simple one, is expensive and should be expert, if therefore, the principle aims and objects of a welfare centre are not adhered to much valuable time and money will have been wasted and little accomplished.

In a primarily native country such as this, the simplest unit is the child welfare centre with a ward for maternity cases attached. Such a unit should be staffed by a trained health visitor and a medical officer (preferably a woman) and this staff should be taken as the minimum requirement.

These centres are of the greatest value when utilized in the correct manner, infants should not be kept on at the centre after the age of one year or two years if the numbers become unwieldy. Treatment should not be provided but babies requiring medical attention should attend the out-patient department at the hospital or dispensary.

Together with the establishment of infant welfare centres the training of African women as mid-wives is a vital step in any attempt to improve the general conditions of the native, and it is pleasing to record that regular training is now being carried on at, at least, two centres and that quite a number of women have already been trained and that some twelve are working in districts in conjunction with recognised centres.

An ordinance was enacted during the year making provision for the certification of trained midwives thus allowing those who have undergone a specified training and passed a standard examination to be officially recognized.

Infant welfare work until this year was almost entirely carried out by mission enterprise, during the year under review, although financial circumstances precluded any addition to the nursing staff of the Medical Department, it was found possible to post a second nursing sister with experience of infant welfare work to the African Hospital, Zomba and a welfare clinic was commenced during March—the number of attendances from March to the end of November totalled 819 and the number of babies enrolled during that period was 204.

It has been found that the wives of the native civil servants and the women of the better class look after their babies well and progress may be compared very favourably with that of the European child.

The children of the woman of the peasant type do not make such good progress and from intercurrent disease are inclined to be marasmic, improvement occurs after the administration of cod liver oil and fresh milk.

From June to November seventeen maternity cases were dealt with at the African hospital Zomba, of which eleven were normal. Seven antenatal cases have been booked at the hospital and three have been delivered successfully. Tobacco baskets placed on wooden stands have been used most successfully as cots, and some of the mothers have copied this example afterwards in their own homes.

Weekly visits are made by the nursing sister to the homes of registered women living in the vicinity, much of the success of the clinic depends upon gaining the confidence of the women and upon their being well acquainted with the sister.

The infant welfare centre at Mlanda under the 'aegis' of the Dutch Reformed Church is staffed with a lady medical officer and qualified nursing sister and was assisted to a small extent by a grant from Government. Two native mid-wives were trained during the year and six are now working in their own districts, unfortunately some of these women are too far away to be visited regularly, records of their work are however inspected and their services are much appreciated in the villages. Two district clinics have been instituted, one of these is held in a special brick building erected for this specific purpose by the Native Authority Philip Gomani, both he and his wife lend their support to this movement. The clinics together with the interest displayed by the Native Authority are having a decided effect for good on village sanitation.

Owing to shortage of staff, the work at the infant welfare and maternity centre at Bandawe was much handicapped during the year.

At the Jeanes' School, Domasi, instruction of the wives of the pupils in both infant welfare and maternity work is being continued. At such an institution it is, of course, impracticable to give the women anything approaching a full maternity course of training, but owing to the small number of trained native mid-wives available, it is considered well worth while for some elementary knowledge to be imparted, so that normal cases may be dealt with hygienically and abnormal cases may to some extent be recognised. The fact that such instruction is of value and is useful is endorsed by letters received from the women who speak of the practical advantages of the course. Six confinements were dealt with at the Jeanes' School.

At Kota-Kota, a maternity and child welfare centre is conducted by the U.M.C.A. who have a trained nurse in charge. The Mission year is actually from November 1st, 1934, to October 31st, 1935, during this period the following cases were dealt with:—

A. Ante-natal cases.	
Total number of new cases	55
Attendances	224
B. Maternity cases.	
Number attended in labour	74
,, ,, in puerperium	5
,, ,, for abortion	9
Maternal deaths	3

Of the 79 births, two were born dead and four infants were premature. Two of the maternal deaths were no doubt accelerated by a severe condition of anaemia which was observed.

Some interesting vital statistics were obtained in connection with births and deaths of infants who had attended the clinic from 1932-1935.

	1932		1933		1934		1935		Total	
	M	F	M	F	M	F	M	F	M	F
Babies born	10	19	15	9	13	21	23	39	61	88
Since died	5	6	5	1	8	2	2	8	20	17
Untraced	—	1	1	—	—	1	1	—	2	2
Total known survivors									39	69

At the welfare and maternity hospital, Church of Scotland Mission, Blantyre, the medical officer in charge reports that cases are coming in earlier for confinement and that there was a larger proportion of normal cases.

The admissions were 170 as against 155 for 1934. The maternal death rate of 25% in abnormal cases is high as is also the infant mortality rate of 90 per 1,000.

There are five native mid-wives operating in the district, they are doing excellent work.

The infant welfare clinic is confined to babies under one year old and the numbers are steadily increasing.

A health day at the Ndirande centre produced 147 entrants for the July show.

Four women took the mid-wives' course and obtained certificates.

Some interesting figures are available with reference to the measurements of the native pelvis as the result of an analysis of some 300 normal deliveries at the Hospital and are given in the following table:—

PELVIC MEASUREMENTS IN NATIVES*

Native Pelvic Measurements	Average English Measurements	Native Infants	English Infants
Interspinous Diameter 7.9″ ...	9½″—10″ ...	Length 18″ ...	20″
Intercristal Diameter 8.9″ ...	10½″—11″ ...	Weight 6 lbs. 6 ozs. ...	7 lbs.
External Conjugate 7″ ...	7½″—8 ″ ...	...	

SECTION VI. HOSPITALS AND DISPENSARIES.

(*a*) EUROPEAN HOSPITALS.

There is nothing of note to add to the remarks made in previous reports upon these institutions.

Every effort is made to keep them as efficient as possible.

Water closets with a septic tank system have been installed at Zomba and a portable X-ray plant has been provided for the hospital at Blantyre.

(*b*) NATIVE HOSPITALS.

It is unfortunate that the lack of staff has prevented the three child welfare clinics erected from Colonial Development Funds from being utilized in the manner for which they were intended. Yet it is refreshing to find that the expansion of native hospitals which has taken place during the last few years is having a definite educational effect on the native population and is gradually accustoming them to seek for skilled European treatment in case of illness.

As an example of the accommodation provided for Africans from Colonial Development Funds, photographs of interiors of a ward and an operating theatre are inserted overleaf.

Native authorities are stressing the importance of women using the hospital for their confinements and the following list of surgical operations gives some evidence of the natives' faith and confidence in European methods of treatment.

1. *Abdominal*—	
Appendicectomy	18
Cholecystectomy	1
Splenectomy	1
Others	2
2. *Rectal*—	
Fistula	3
Haemorrhoids	4
Prolapse	1
Ischio-rectal abscess	3
3. *Hernia*—radical cure ...	37
4. *Genito-urinary*—	
Hydrocele, radical cure ...	31
Fistula	1
Orchidectomy	3
Elephantiasis, scrotum ...	1
,, vulva	2
Perinephric abscess	1
Cystotomy	3
5. *Gynaecological*—	
Salpingectomy	6
Hysterectomy	2
Ventrofixation	2
Curettage	4
6. *Bones and Joints*—	
Amputations	20
Dislocations	16
Sequestrectomy	22
Tenotomy	2
Talipes equino-varus	2
Pes cavus	1
Fractures, compound	4
,, plating and wiring ...	4
7. *Eye*—	
Cataract	11
Staphyloma	2
Pterigium	4
Iridectomy	1
Excision of eyeball	1
8. *Other operations*—	
Craniotomy	5
Adenectomies	5
Ganglion	14
Tumours and cysts	66
Partial thyroidectomies ...	6
Skin grafts	9
Pre-sacral neurectomy	1

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* Janet Welch, Annual Report, Blantyre Mission, 1935.

Some surgical notes and comments on some of the more interesting cases follow :

1. *Initiation Ceremony.*

As with other African races, the initiation ceremony of the Yaos marks the passage from childhood to manhood. These ceremonies are conducted with the utmost secrecy in the bush, far removed from villages. Elaborate precautions are taken to ensure that no unauthorized person shall approach the selected site during the period of initiation which, in the case of the Yaos, occupies one month.

During this time the boys are taught the duties and obligations of men to each other, to the tribe, to their wives and families and to their elders. Instruction in sexual matters is an important point and, as a preliminary to this, circumcision is performed.

The usual age at which the rite is attended is twelve, but, since there is considerable expense involved, the poorer families may be unable to send their sons until the latter are sixteen or over. Each boy brings an adult male attendant who undertakes the instruction of his charge during the initiation period, returns with him to his village and receives a share of the money presented to the youth to mark the occasion.

Circumcision is the first ordeal to be gone through. The boys, dressed in straw cloaks, wearing bamboo masks and fantastic head dresses of weeds, are conducted to the native priest who stands knife in hand, garbed in goat skins, wearing a head dress of eagles feathers and with body hideously daubed with red and white mud. The approach of the initiates is heralded by deafening ululation and drumming. The priest seizes each boy, whose struggles are controlled by the bystanders, and, inserting his index finger through the preputial orifice down to the glans penis, he pulls the prepuce well up with the thumb and second finger, removing it with a sweep of the knife. Drumming and shouting reaches a pitch of frenzy during the actual operation and effectively drowns the screams of the patient. The wound is then covered with mud to control bleeding and a charm is placed round the base of the penis to ensure virility. The boy now passes with his sponsor into a grass hut and disappears from view.

It was pointed out to the village headmen that death from septicaemia not infrequently followed this operation as performed by native priests and that in every case the boys were left with a septic wound which took a long time to heal. It was suggested that these unpleasant sequelae could be avoided if the circumcisions were performed by a medical officer, who would visit the site selected, perform the operations and then leave. Native procedure before and after the circumcision would in no way be interferred with.

The proposal was accepted and several villages were visited. That our services were appreciated is shown by the following facts :—

> 1. The initiation ceremony is performed during the months of June and July of every year. Our participation in it was not suggested until July of this year. Many meetings were therefore postponed until August and September in order that we might take part.
>
> 2. Motor roads were cleared by the natives to enable staff to reach the camp in the bush. This was an unexpected luxury and entirely unasked for.
>
> 3. Drumming during the actual operation, to drown the cries of the boys, was dispensed with in each village after the first few circumcisions had been performed.
>
> No more fitting testimony to the discovery of local anaesthesia is needed. Each boy thus treated will surely be a disciple of the hospital.

The native priest assisted at each operation and, towards the end of the season was performing them himself under supervision. In time the entire ceremony will again be under native control.

Although these remarks are included under the heading " Surgical Notes " the performance of 119 circumcisions adds little to the surgical laurels of the hospital. Indeed, the attractions offered by surgery alone would never have secured our admission to a ceremony so intimately connected with native life as is the initiation rite. That a European has been permitted to participate in these religious practices augers well for future work in this District, and it may be taken as evidence of the fact that natives are beginning to realise the soundness of the principles embodied in the policy of our Department.

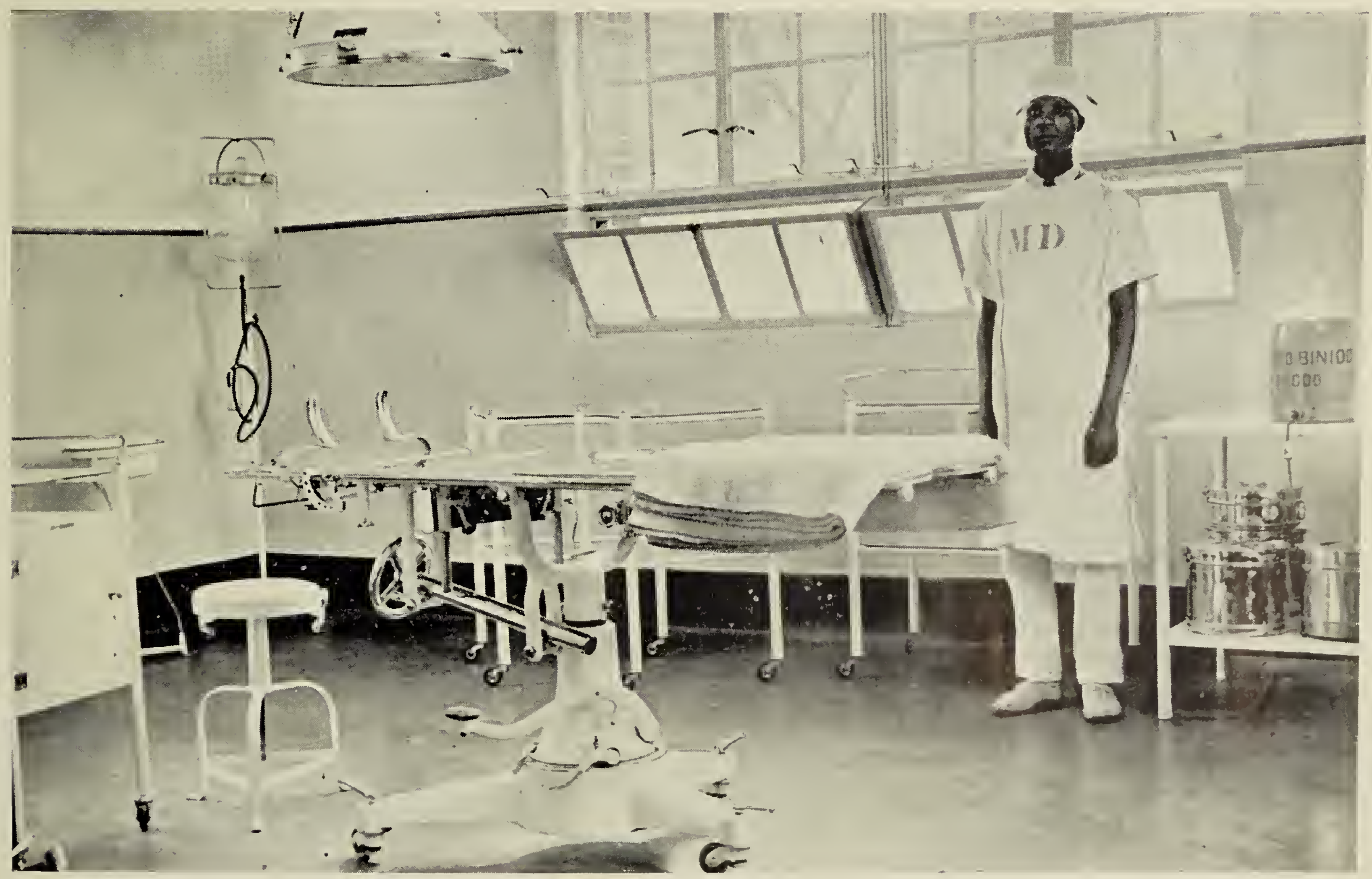
2. *An Application of Cotte's Operation.*

An adult male native, admitted to hospital complained of loss of power of erection. He stated that following a fall from a rock eighteen months previously, he found that he was unable to obtain an erection, but that after several months the power was regained to some extent.

This was the chief complaint and it is typical of the Yao that, until the time of examination, he made no reference to the fact that he also had loss of bladder control. After his accident he was unable to pass water for forty-eight hours : thereafter he found that by sitting down and pressing on the lower abdomen with his hands he could void urine. He had no desire to urinate but felt pain suprapubically when the bladder became full.

At first there was no difficulty in retaining urine, but later he developed an overflow incontinence when attempts to empty the bladder were neglected.

Ward, African Hospital, Zomba.



Operating Theatre, African Hospital, Zomba.

On examination he was seen to be a well-nourished man of about forty years of age. Examination was normal except for a mass in the lower abdomen extending from the pubis to within one inch of the umbilicus. There was a good deal of excoriation about the genitalia from dribbling of urine. After voiding as above, residual urine of twenty-seven ounces was obtained by catheter. Catheterization was painful and the posterior urethra sensitive. Rectal examination showed a poor tone of the sphincters. The bulbocavernosus reflex was present but weak; neurologic examination was negative except for an area of anaesthesia about the anus and scrotum (in third, fourth and fifth sacral segments).

The diagnosis of "cord bladder" was made, due to injury of the third to fifth sacral segments, the original lesion probably being a fracture dislocation about the level of the second lumbar vertebra.

The site of injury showed that the sympathetic innervation of the bladder was intact. The hypersensitive posterior urethra with the weak bulbocavernosus reflex showed an intact pathway by the pudic nerves. Absence of the desire to urinate and inability to urinate satisfactorily indicated damage to the sacral autonomic supply by way of the pelvic nerves. Since partial emptying of the bladder was possible and since the power of erection was present, there was not a total lack of impulse by the pelvic nerves, but a lack of balance between the sympathetic and parasympathetic, the filling phase of the bladder being stronger than the detrusor forces.

It was therefore decided to interrupt the sympathetic by resecting the presacral nerve.

Post operative progress.—The in-dwelling catheter was removed on the tenth day. On subsequent days residual urine was from twelve to fifteen ounces. After twenty-two days the catheter was passed once daily and showed residual urine of seven to eight ounces. The patient was discharged from hospital thirty days after operation.

When last examined he stated that even when the bladder was allowed to become distended there was no pain and that he could void urine well when standing up. When sitting down he could empty the bladder to within two or three ounces. He depends entirely on the external sphincter for control and this is therefore not perfect when the patient is sleeping. He has no retention with overflow.

There can be no doubt but that this man is more comfortable.

3. *A Subdural Haematoma.*

An adult male native, aged about thirty, was admitted to hospital complaining of urinary incontinence. It was observed that he had lost contact with his environment. He exhibited slow, involuntary, rhythmical movements of the left hand—athetosis.

His defective co-operation complicated the investigation of the case, but relatives stated that these symptoms were of some four months duration and that, in addition, the patient occasionally complained of headache. His memory appeared to be defective.

Physical examination, as far as it could be carried out in the difficult circumstances, revealed no abnormality, except a scar, four inches in length, over the right patietal region of the calvarium, adherent to the underlying bone. This was said to have been caused by a blow with an axe four years previously. It was observed that the patient experienced pain when this area of the skull was percussed.

Blood examination was negative and the fluid obtained by lumbar puncture showed no pathological change. The formol-gel reaction was negative.

At first it was thought that in spite of the negative findings, the patient was suffering from trypanosomiasis, but later it seemed possible that the condition might be the result of a subdural haematoma. It was therefore decided to investigate the condition of the cranial contents.

Bilateral trephine openings were made over the Rolandic areas on each side of the skull. There was no evidence of fracture. On the left side the dura was normal, but on the right side, at a point corresponding with the anterior extremity of the scalp wound, the dura was seen to be tense and of a bluish colour. Dark brown fluid was withdrawn from the subdural space with a fine aspirating needle and the membrane was thereupon incised; the escape of one or two ounces of altered blood followed. With as little disturbance as possible, the cavity of the haematoma was irrigated with warm saline and a few clots washed out. The wounds were closed in the usual manner.

Result.

The patient is still mentally confused. This is probably the result of molecular damage to the brain and will not improve. The athetosis has stopped, the headache is gone and control of the bladder has been regained.

4. *Chronic Leg Ulcer.*

Since the treatment of chronic ulcer of the leg by adhesive plaster strapping has been introduced, there has been much speculation as to why this technique is so successful.

Prior to the use of the strapping method, treatment was confined to the constant application of chemicals in irrigations, compresses, formentations and in frequent dressings. Scraping and skin grafting were also practised. Organisms were permitted to drift into the wound or were carried by the attendants into areas that should never have been disturbed. Neither the patient nor his ulcer had protection or rest.

Failure to deal with the condition satisfactorily was ascribed to a number of causes, but never to the correct one, namely that our methods in treatment of those ulcers were such as to show that the teachings of Hunter, Hilton and Lister had been forgotten.

Many years ago these surgeons enunciated the following principles as being of fundamental importance in surgical practice :—

1. The employment of the natural forces of repair. (John Hunter).

2. The protection of the wound against irritative movement and muscle spasm. (John Hilton).

3. The protection of the wound against injury by trauma, infection or chemical irritation. (Joseph Lister).

These three essential requirements are embodied in the modern method of treating leg ulcers by adhesive plaster strapping.

Prior to its introduction, the antiseptic treatment of such conditions had become so altered that less regard was shown to these original principles than even in Lister's time. These distinguished surgeons realized to the full the *vis medicatrix naturae* when free from meddlesome interference. The value of their teachings, which appears to be in danger of being forgotten, can hardly be better exemplified than in their application to the modern treatment of tropical ulcer.

From the above remarks it must not be concluded that surgery alone occupies the most important place in hospital treatment, all branches of medical treatment are fully represented and the following cases selected at random show the infinite variety of interesting conditions which are met with :—

Klumpke's paralysis—tubercular disease of dorsal and cervical vertebrae.
Carcinoma of stomach. Phantom pregnancy. Abscess of cerebellum.
Four cases of epilepsy in a batch of 40 recruits.
A series of seven cases of pulmonary tuberculosis.
Pneumococcal peritonitis with sudden death. Ludwig's angina with gas gangrene.
Erisipelas from a scratch from a dried fish bone.
Two cases of acute myositis in the muscles of the leg? Deficiency disease?
Spastic paraplegia with positive Sachs-Georgi.
Blindness in each eye with different pathological conditions, viz., right eye = optic atrophy and glaucoma. left eye = detachment of retina.
Organic heart disease in a boy of 12 years. A case of lymphadenoma.
Tetanus with death from a human bite.
Macrocytic hyperchromic anaemia in a pregnant woman.
Confusional insanity in a case of pneumonia.
Syphilitic optic atrophy. Syphilitic basal meningitis.
Three cases of cerebral malaria in children.
Double mitral and aortic disease in a child of 6 years.
A bilharzial appendicitis. A case of Van Recklinghausen's disease.

(c) RURAL DISPENSARIES.

An up-to-date map in attached showing the approximate distribution of the rural dispensary and hospital system in the Protectorate.

Considerable re—organization of the system of rural dispensaries has taken place.

(i) Treatment.

The limitation of the general and medical education of the African dispenser has been realised and only cases considered "suitable" are permitted to be treated at dispensaries.

A list of such diseases has been circulated.

A scale of treatment for the diseases to be treated at dispensaries has been laid down and a standardized list of the mixtures, lotions, ointments and tablets to be used at dispensaries has been prepared.

(ii) Staff.

Old, ignorant and useless staff are being weeded out, the educational standard is being raised.

Dispensers are now expected to visit the villages in their immediate vicinity and give advice on sanitary matters.

Vaccination is now performed by dispensers.

All dispensers are expected to undergo a "refresher" course at the central hospital at least every 18 months.

(iii) Supervision has been extended and all dispensaries are visited regularly.

A summary of the cases treated at native hospitals and rural dispensaries is given below :—

	1934			1935				
	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Area in sq. miles	Rank of officer in charge
	In-Pts.	Out-Pts.	Out-Pts.	In-Pts.	Out-Pts.	Out-Pts.		
Blantyre	—	8,126	25,079	—	4,472	30,012	860	S.M.O.
Chikwawa	285	3,831	9,979	309	4,248	13,038	1,897	S.A.S.
Chiradzulu	358	7,022	11,417	400	7,059	14,672	270	S.A.S.
Cholo	829	6,458	5,243	800	5,294	4,317	624	M.O.
Chinteche	547	3,785	6,003	739	7,589	8,456	1,925	Hosp. Asst.
Dowa	240	4,418	12,987	242	3,742	10,936	1,802	S.A.S. & Hosp. Asst.
Dedza	225	2,482	19,851	279	3,125	34,380	1,818	M.O.
Fort Johnston	783	5,963	8,170	1,278	12,404	5,484	2,518	M.O.
Fort Manning	349	2,572	7,107	408	2,939	7,809	1,453	S.A.S.
Karonga	491	8,240	21,337	666	7,593	23,520	3,004	M.O.
Kasungu	251	4,181	4.794	222	5,588	5,096	3,330	S.A.S.
Kota Kota	401	11,119	15,404	484	11,173	12,666	2,430	M.O.
Lilongwe	256	4,051	4,578	239	3,859	5,520	2,677	M.O.
Liwonde	163	3,725	12,904	218	3,574	11,529	2,045	Hosp. Asst.
Mlanje	702	10,163	9,489	655	8,847	12,038	1,531	M.O.
Mzimba	132	4,411	13,571	158	4,655	15,763	5,729	S.A.S.
Ncheu	250	7,970	11,571	321	7,456	15,126	1,092	Hosp. Asst.
Neno	—	—	8,204	—	—	37,248	941	S.M.O. Blantyre
Port Herald	259	2,733	16,803	290	2,722	13,951	747	S.A.S.
Zomba	1,553	8,431	36,556	1,704	9,072	33,903	903	M.O.
K.A.R. Hospital	413	3,675	–	146	3,589	—	—	,,
Central Prison Hospital ...	557	2,449	—	494	2,442	—	—	,,
Total	9,044	114,805	261,047	10,052	121,442	315,464		

Note.

In the above table all patients attending for treatment are now recorded in the first instance as out-patients whether or not they are subsequently admitted to hospital. To obtain the total of those who received out-patient treatment only, the in-patient figures should be subtracted from the combined total.

An interesting experiment was made in one district by providing medical services to natives at their homes during the planting season when attendance at the central hospital was difficult owing to agricultural activity.

A medical camp consisted of two tents, two dispensers, one vaccinator and four hospital servants. The camps were held in the vicinity of rural dispensaries and were repeatedly visited by the medical officer. Vaccinations were checked, meetings and discussions on hygiene and sanitation were held with the local headmen or chiefs. Medical surveys and active treatment were carried out.

The camps were so successful in increasing the numbers of in-patients at the central hospital, that they had either to be abandoned or curtailed as the staff was required for hospital duties.

The percentage of attendances for medical treatment was vastly increased. The efficiency of the rural dispensaries was increased. Increased confidence in hospital practice amongst the general population was obtained.

SECTION VII. PRISONS AND ASYLUMS.

The Central Prison, Zomba, and the Lunatic Asylum are under the administration of the Chief Commissioner of Police. Both Prison and Asylum are under the immediate control of the Superintendent of Prisons.

The health of the prisoners may be said to be satisfactory.

The average number of prisoners has fallen in 1935 to 370.64 from 510.39 in 1934, and the daily average number in hospital from 35.34 in 1934 to 28.68 in 1935. A medical examination is made on each new admission, stools and urines are also examined.

With regard to the Asylum an investigation and medical survey of all inmates was commenced in 1934 by a medical officer, but was never completed. During 1935 two medical officers attempted this task and towards the end of the year all the inmates of the Asylum had been fully examined both from the physical and mental aspect, much valuable information has been obtained.

The report has not yet been submitted, it is understood, however, that strong recommendations are made for this institution to be taken over and administered as a mental hospital by the Medical Department.

SECTION VIII. SCIENTIFIC.

A. ANNUAL REPORT OF THE MEDICAL ENTOMOLOGIST FOR 1935.

Tsetse Surveys. I proceeded in May to the Northern Province for the purpose of making a ceconnaissance for tsetse fly in the Dowa and Fort Manning districts.

I left the Great North Road at the Lombadzi River, and then travelled afoot west to Fort Manning along the southern edge of the fly-infected area, returning to Lilongwe through the region that was formerly menaced.

I again visited the area in October when I was accompanied by Mr. C. F. M. Swynnerton, the Director of Tsetse Research in Tanganyika Territory, who was desirous of seeing in the few days at his disposal what he could of the control measures that were initiated in 1926. We then visited the neighbourhood of the Mudi River in Dowa and the upper reaches of the Ludzi in Fort Manning, regions in which the fly formerly exhibited a marked tendency to extend.

The conclusions that I reached in May were that the situation continues to remain a satisfactory one, for I could find none of the insects south of the Mudi where there was formerly a focus; the Kalembo thickets were devoid of them, and my impression was that a marked diminution in their numbers had taken place to a depth of two or three miles in the actual fly area. A focus south of the Ludzi, at its junction with the Bua, still exists, however, though the insects seem neither to be increasing nor to be showing any tendency to spread.

(2) *Enquiry into outbreak of Sleeping Sickness in the Bechuanaland Protectorate.* My services were lent for two months by the Government of this territory, on the application of the Government of that Protectorate, for the purpose of investigating an outbreak of sleeping sickness. I left in the first week of June, returning on completion of my mission in the first week of August. A full report was duly submitted.

(3) *Research.* I continued my study of the possible part played by the non-biting blood-drinking Muscid flies in the dissemination of pathogenic organisms.

As concerns the *Bacillus leprae* I set out in the first instance to try to find an explanation for discrepancies in some of my previous results. Some of the flies, *Musca sorbens,* that had fed together on leprous material deposited the bacilli freely on food material when they fed again shortly after their first meal while others failed to do so. Again, a fly that had fed on this material might deposit the bacilli when feeding a few minutes afterwards, might not do so when feeding ten or fifteen minutes later, but would do so, maybe one, two or even more hours afterwards. The explanation proved ultimately to be a very simple one, for I found that the deposit of the bacilli is determined by regurgitant acts on the part of the fly. As is common knowledge, such flies bring up to the mouthparts liquid food that has been ingested, turn it over again and again, occasionally let it fall but more often than not swallow it again the transfer of food-material from crop to stomach being involved in these acts (a process akin to the chewing of the cud by ruminant animals). Each of such acts may leave the proboscis contaminated by whatever organisms the food material has contained, and between the acts of regurgitation the insects feed under normal circumstances, for their appetities are almost insatiable. It is in this way that the bacilli are deposited.

The correctness of this conclusion was proved by feeding on leprous material a batch of bred flies, all the same age and all females, since they are far more voracious than the males, and then providing them individually, at various periods from the meal and shortly after regurgitation, with drops of blood on a slide. In one experiment in which one or other of 24 flies lapped up the blood on 33 occasions shortly after regurgitation no fewer than 23 of the drops were positive for the bacilli, one at 24 hours.

The most successful result in this experiment was obtained with fly No. 6 which deposited the bacilli in great abundance at 4 hours, 5 hours, 5¼, and 6½ hours and sparingly at 24 hours, each time shortly after regurgitation.

The certainty that the fly must be responsible in nature for the dissemination of the organisms in the way indicated was brought home to me in the course of this experimental work. When the leprous subject who had a number of open sores came to the laboratory he invariably brought in a number of the insects that were feeding on them. Some of these flies were watched moving about the building, duly regurgitating, and it needed frequent effort, which was not always successful, to prevent them alighting on oneself, while partly engorged insects, in which the bacilli were found, were actually collected off native assistants.

The question whether infection could be produced in this way would seem to depend on whether or not the viability of the organisms is impaired by their coming in contact with the secretions of the upper part of the alimentary tract of the insects. But since the work of attempting to make cultures is a purely bacteriological one I endeavoured to explore the only alternative possible, feeding flies shortly after regurgitation following an infected meal on scarifications on the ears of baboons.

2 (*b*). I then extended the investigation to *T. rhodesiense,* finding that these organisms may be similarly laid down by the flies in blood serum on a slide, and in this case I proved their viability by feeding some of the flies half an hour from the infecting meal and after regurgitation at a freshly-made scratch on the ear of a dog. The trypanosomes were found in the peripheral blood of the animal 35 days later.

2 (*c*). I then turned my attention to the possibility of the transmission of yaws by these flies.

The investigation proved difficult at first from my inability to obtain a suitable vector. Examinations of the exudate from yaws in eleven different patients, which I carried out in association with Dr. C. H. Howat, proved negative for spirochaetes, but, with the idea in mind that there might be a granular phase of the organism I fed bred flies on this material, and then, shortly after they had regurgitated, on freshly-made scratches and on sores on one or other of five native volunteers. There was no result.

The presence of the organisms at the surface and in fair numbers being obviously a necessary factor if flies do play part in the transmission I then conducted, again with Dr. Howat's kind help, a daily examination of the secretion from a particular yaw on the neck of an African woman. It was negative on fifteen occasions. On the sixteenth Dr. Howat noticed that while the yaw remained unchanged in size and appearance a marked increase in the amount of exudate had taken place within the twenty-four hours, so much so that the crust had become raised by the pressure of fluid beneath it which was oozing naturally at several points and trickling down the neck of the patient. In this fluid the spirochaetes were found for the first time, and in abundance.

I then fed some of the flies on it and in due course transferred two at one hour later, three one hours and five minutes later and one at one hour twenty minutes later to a small infected breach of surface, the result of itch, on the shoulder of a native who volunteered for the experiment. All the flies fed, but the condition soon cleared and there was no further development.

I then fed two others of the infected flies on similar sores from scabies on a second volunteer, and then, making a small linear scratch over his shoulder blade, allowed four others of these flies to feed, one at 35 minutes from the infecting meal, two at 45 minutes and one at 50 minutes, the scratch being freshed with a needle for each insect to enable it to secure as much of the serosanguineous exudation as it felt disposed. The scabies sores completely cleared up, but a papule, the size of a pin's head, appeared in the scratch on the 30th day, and gradually took on the characteristics of a primary yaw. No spirochaetes were, however, found in the exudation which was never abundant. Five secondary papules then made their appearance, and in the only one examined, the secretion from which had been negative as to spirochaetes 24 hours previously, the organisms were found in abundance, on the seventy-sixth day from that on which the flies had fed. Definite proof that the fly may transmit the organisms as the result of a normal purposive act was thus obtained.

A full report, in which were embodied the clinical notes of the two cases due to Dr. Howat was submitted.

2 (*d*). I then endeavoured to ascertain if cyclical development of *T. pertenue* takes place within the flies. For this purpose I fed the insects on exudation from a yaw known to contain the organisms, and dissected them at intervals in the course of 2 to 25 days from their feed. Forty-two in all were so dealt with, every region of the alimentary canal for the most part being stained and examined microscopically, but without result.

2 (*e*). I studied in association with Dr. Howat a case of sleeping sickness, presenting unusual features, in an African male adult, and carried out some experimental work in this connection.

The patient who resided in a tsetse-fly area had come to hospital with symptoms that proved to be due to bilharzia and to hookworm. When in accordance with his routine practice Dr. Howat examined the blood he found that trypanosomes were present.

The patient was kept by Dr. Howat under observation for almost six months during which time, except for two slight and very transient rises of temperature which did not inconvenience him he manifested no signs or symptoms of his infection.

A bred *G. morsitans*, which I fed on his blood, developed a salivary infection in due course, whilst a subinoculated rat speedily developed a general infection, posterior nuclear forms, which suggest the probability of the organisms being *T. rhodesiense*, appearing in its peripheral blood.

A joint report by Dr. Howat and myself on this case was submitted.

2 (*f*). I endeavoured with Dr. Howat's assistance to obtain cultures of *Trypanosoma theileri* from blood withdrawn from native cattle, with a view to to obtaining more light on the problem of the insect vector involved. Our efforts were, however unsuccessful, possibly from the difficulty of keeping the temperature of the medium sufficiently low; for the great majority of the tubes remained sterile.

2 (*g*). I further attempted, to ascertain the significance, if any, as concerns man, of the presence of filariform Nematode worms found in great abundance in about 2-3% of captured *M. sorbens*, for it seemed to me that these might well be developmental forms of one or other of the intestinal worms known to occur in this country, the lifecycle of which does not appear to have yet been fully worked out. To this end I fed them to baboons, and endeavoured to ascertain if they could penetrate the skin, but to no purposes. These animals are indeed already heavily infested with a variety of such parasites.

2 (*h*). In the course of the last few weeks of the year I conducted a series of examinations of the excreta of *G. morsitans*, for, by the chance examination of such material earlier on, I had found that four captured flies were passing flagellated organisms in great abundance. I had in the meantime submitted films of these to Professor J. G. Thomson, who suggested that they might possibly be forms of *Trypanosoma grayi*.

The problem of their identity is of course a matter of great importance, this trypanosome occurring only in Reptilia; its vectors, so far as is known at present being, *G. palpalis*, *G. brevipalpis* and *G. tachinoides,* while so far no member of the morsitans group has been incriminated. If the organisms did prove to be *T. grayi* information bearing on the feeding habits of this group might be considerably amplified.

As a preliminary, and with a view to getting data bearing on the incidence of the organisms in nature I maintained a series of captured flies over as long a period as possible, examining the excreta they passed from time to time. Out of a total of 169 flies that were under observation up to the end of the year 29 passed the organisms at some time or other. The most striking result was obtained in regard to fly No. 17 which passed flagellates on the 17th, 19th, 20th, 29th, 32nd, 34th, 35th and 39th day after its capture, and when I dissected it on the 39th day I found enormous numbers at the proventriculus and below it, a fact suggesting in itself that the organisms may be developmental forms of *T. grayi* rather than those of any other trypanosome.

22nd February, 1936.

W. A. Lamborn.
Medical Entomologist

B. ANNUAL REPORT OF THE MEDICAL LABORATORY, ZOMBA.

Staff.

The Government Pathologist: Dr. Horace M. Shelley.

African Laboratory Assistant: Rabson German.

3rd Grade Dispenser: Damson Boloweza.

Three laboratory labourers.

One night watchman.

SECTION (1) GENERAL REVIEW OF THE YEAR.

A total of 9,370 specimens were received for examination during the year, which is an increase of more than 5,000 over the figure for the previous year. It will be appreciated that in order to keep pace with this progressive and satisfactory increase in the amount of work, but little time is available for any operations other than those of a routine nature. It has been possible however, to conduct several investigations of interest which will be referred to later in this report.

My recommendations for the improvement of laboratory service are as follows:—

(1) The provision of a trained European or Indian laboratory assistant who can undertake such work as the manufacture of media, and who can supervise the ordinary routine examinations. The presence of such a person would leave me free to devote my time to work of more importance and of more technical difficulty.

(2) The provision of a good native clerk.

(3) The provision of a suitable animal house. At present the few laboratory animals live in wooden boxes outside the building, where they are exposed to the effects of inclement weather, and where it is difficult to carry out accurate observations.

SECTION (2) STATIONS FROM WHICH SPECIMENS WERE RECEIVED.

Station.	*Number of specimens.*
Zomba	8,024
Cholo	386
Missions	66
Lilongwe	325
Karonga	15
Limbe	3
Blantyre	55
Fort Manning	13
Dedza	5
Kota-Kota	3
Fort Johnston	10
Mlanje	458
Chikwawa	1
Port Herald	1
Fort Jameson	3
Portuguese East Africa	2

SECTION (3) THE FINANCIAL VALUE OF THE WORK ACCOMPLISHED.

The approximate cost of the various examinations has been calculated according to the tariff of fees issued by one of the routine laboratories in South Africa.

	£	s.	d.
Poison analyses, 175 @ 100/- each	875	0	0
Test for seminal stains, 6 @ 10/-	3	0	0
Plant identifications, 20 @ 10/-	10	0	0
Tests for blood stains, 46 @ 10/-	23	0	0
Precipitin tests for blood, 44 @ 20/-	44	0	0
Blood groupings, 31 @ 10/-	15	10	0
Miscellaneous medico-legal examinations, 50 @ 10/-	25	0	0
Histological examinations of tissue, 49 @ 20/-	49	0	0
Manufacture of vaccines, 14 @ 40/-	28	0	0

	£	s.	d.
Gastric analyses, 2 @ 20/-	2	0	0
Typing of sputum, 10 @ 10/-	5	0	0
Water analyses, 9 @ 40/-	18	0	0
Tuberculin tests, 7 @ 20/-	7	0	0
Blood sugar estimations, 1 @ 20/-	1	0	0
Blood urea estimations, 2 @ 20/-	2	0	0
Arneth counts, 20 @ 10/-	10	0	0
Complete blood counts, 17 @ 20/-	17	0	0
Differential counts, 30 @ 10/-	15	0	0
Bendien tests, 2 @ 40/-	4	0	0
Weil Felix tests, 2 @ 20/-	2	0	0
Widal tests, 15 @ 20/-	15	0	0
Blood cultures, 6 @ 20/-	6	0	0
Cerebro-spinal fluids, 6 @ 20/-	6	0	0
Sachs-Georgi tests, 339 @ 20/-	339	0	0
Blood films, 2,669 @ 10/-	1,334	10	0
Urine examinations, 1,943 @ 10/-	971	10	0
Faeces examinations, 2,145 @ 10/-	1,072	10	0
Miscellaneous examinations, 322 @ 10/- ...	161	0	0
Total	£5,061	0	0

SECTION (4) PATHOLOGICAL AND BACTERIOLOGICAL SECTION.

(A) *Blood Specimens.*

Complete cell counts	17
Differential counts	30
Reticulocyte counts	18
Arneth counts	20
Measurement of red cells	30
Blood groupings	10
Films for parasites	2,669
Sachs-Georgi tests	339
Bendien tests	2
Sera for yellow fever	40
Blood transfusions	4
Widal tests	15
Blood cultures	6
Blood sugar estimations	1
Blood urea estimations	2
Weil Felix tests	2

(1) *Measurement of red blood cells.*

The modified "Halo Method" as described by Merlin Pryce in an article in the Lancet, August 10th, 1935, page 275, was used for the above-mentioned purpose. This procedure has been found sufficiently accurate for clinical purposes, and possesses the great advantage of being a speedy operation which is completed in a few moments.

The variation observed in the red cells of the average native of this country is very striking; in certain specimens cells differing in diameter by as much as 1.5*u* may be seen, and this fact is important, for the size of the erythrocyte containing parasites has a bearing upon the differentiation of the species of Plasmodia. Thus in the examination of blood smears from natives, the observer may be misled if he relies too much upon the relative size of red cells as an indication of the species of malarial parasite which is present.

(2) *Malaria, etc.*

2,669 films were examined for the presence of parasites, of which number 2,089 proved negative. Of the positive films 64.3 per cent. contained *Plasmodium falciparum* 23.4 per cent. contained *Plasmodium malariae*, 8.1 per cent. contained *Plasmodium vivax*, 2.4 per cent. contained *Treponema duttoni*, and 0.1 per cent. contained *Wuchereria bancrofti*.

(3) *Modified Sachs-Georgi Test for Syphilis.*

339 tests were performed of which number, 103 were positive. Each serum was tested in the following dilutions, 1/5, 1/10, 1/20, 1/40, 1/80.

The test has proved very reliable, and a particularly delicate control of treatment.

(4) *Sera for Yellow Fever immunity tests.*

By the courtesy of Dr. W. A. Sawyer, Director of the International Health Division of the Rockefeller Foundation, New York, the sera from adult natives residing in different parts of the country, were examined for evidence of protective power against yellow fever virus. All the sera, with the exception of two which were contaminated and toxic for mice, were found to be entirely without protective power, indicating that none of the donors had suffered from the disease.

(5) *Widal tests.*

15 tests were performed, all with negative results. Formalised broth cultures of *B. typhosu* *B. paratyphosus A*, *B. paratyphosus B*, *Br. melitensis* were used in all the tests.

(6) *Weil-Felix Reaction.*

A suspected case of typhus fever occurred in an adult European male. The serum from the patient was put up in the dilutions mentioned below against emulsions of the following organisms

Date.	Organisms.	Dilutions of serum.	1/40.	1/80.	1/160.	1/320.	1/640.
3.12.35.	Proteus X19.		—	—	—	—	—
14.12.35.	Proteus X19.		+	+	—	—	—
	Proteus OX2.		+	+	+	—	—
31.12.35.	Proteus X19.		+	+	+	—	—
	Proteus OX2.		+	+	+	—	—
	Proteus OXK.		+	+	—	—	—

It is thus evident that the patient was suffering from a fever of the typhus group; the first case of such disease to be reported in this country.

(*B*) *Faecal Specimens.*

The total number of specimens examined was	2,145
Examinations for helminths and protozoa	2,136
Negative examinations	1,154
Positive examinations	982
Specimens positive for hookworm	574
,, ,, ,, *S. mansoni*	75
,, ,, ,, Ascaris ova	65
,, ,, ,, Taenia ova	7
,, ,, ,, Enterobius ova	1
,, ,, ,, Trichuris ova	4
,, ,, ,, Strongyloides larvae	2
,, ,, ,, E. histolytica	182
,, ,, ,, *E. coli*	70
,, ,, ,, *Balantidium coli*	1
Bacteriological and chemical examinations.	
Cultures	6
Occult blood	2
Fat estimations	4

(1) *The relative incidence of parasites found in native stools.*

The results mentioned below were based on the examination of nearly 5,000 specimens, by the simple smear method. Four smears were searched previous to recording a negative result.

Parasite.	Percentage Incidence.
Hookworm	30.1
S. mansoni	2.7
Ascaris	3.7
Taenia	0.2
Enterobius	0.25
Trichuris	0.35
Strongyloides	0.7
E. histolytica	6.1
E. coli	10.6
Balantidium coli	0.05
Giardia intestinalis	0.2
Hymenolepis nana	0.15
Negative examinations	44.9

(2) *Hookworm infestation.*

Over 30 per cent. of the stools from natives contain hookworm ova. The common species of worm in this country is *Necator americanus* and though at one time or another the whole population is probably infested, the clinical effects of the parasite do not appear to be marked, probably because the infestations are usually light ones, an opinion which has received abundant confirmation at autopsy examinations.

(C) *Urine Specimens.*

1,943 specimens of urine were examined chemically and microscopically. It was found that 19.2 per cent. of the urines from natives contained ova of *S. haematobium.*

(D) *Sputa Examinations.*

Total number examined, 92.
Sputa positive for *Mycobact. tuberculosis*, 18.
Typing of pneumococci, 8.(Type 1,1; type 2,0; type 3,1; type 4,6).

(E) *Examination of Cerebro-Spinal fluids.*

Total number examined, 6.
Cell counts, 6.
Nonne-Appelt Globulin tests, 6.

(F) *Examination of Throat Swabs.*

Total number examined, 41.
Number of swabs positive for *Corynebact. diphtheriae*, 11.
(Note, animal inoculations not carried out).

(G) *Examinations of Pus smears, Discharges, and Scrapings, etc.*

Total number of smears examined for *Neisseria gonorrhoea*	68
,, ,, ,, ,, positive for ,, ,, ...	53
,, ,, ,, ,, examined for *Treponema pallidum*	33
,, ,, ,, ,, positive ,, ,, ,, ...	24
,, ,, ,, ,, examined ,, *Mycobact. leprae*	20
,, ,, ,, ,, positive ,, ,, ,, ...	11
,, ,, ,, pus smears examined ,, ,, ...	28
,, ,, ,, examinations of effusion fluids ,, ...	3
Examination of gland juice for trypanosomes ,, ...	2

(H) *Miscellaneous Examinations and Tests.*

Analyses of gastric juice ...	2
Blood groupings	4
Analyses of faeces	2
Blood transfusions given ...	4
Examination of vomitus ...	1
Identifications of insects ...	7
Examination of milk samples ...	1
Complete water analyses ...	9
Tuberculin tests	7

(these tests were carried out on natives four of whom were positive for the human bacillus).

(I) *Manufacture of Vaccines.*

Antistaphylococcal ...	200 c.c.
Antipyorrheal	100 c.c.
Antimastitis	400 c.c.
Anticatarrhal	200 c.c.

The above mentioned vaccines were manufactured during the year.

(J) *Manufacture of Media and Reagents for issue to Stations.*

The undermentioned media and reagents were manufactured and issued to stations during the year.

Nutrient broth	2,000 c.c.
Agar-Agar	500 c.c.
Benedict's solution for sugar estimations	5,000 c.c.

(*K*) *Histological Examination of Tissues.*

The total number of tissues examined was 40.

Tumours :—

Papillomata	1	
Carcinomata	3	(Bladder, cervix, and breast).
Sarcomata	1	(Jaw).
Fibromata	3	
Myxomata	2	(Parotid and thigh).
Mixed celled tumour	1	(Jaw).
Chondromata	1	(Radius).
Lymphadenomata	1	(Gland).
Filariasis of testicle	2	
Filarial labium majus	1	
Juxta-articular nodules	2	
Blastomycoses	1	(Jaw).

Other tissues :

Schistosomiasis of the appendix	4
Miscellaneous normal tissues	17
Syphilis of the brain	1
Cysticercus in brain	1
Toes, ainhum	2

(*L*) *Autopsies,* (*excluding those of a Medico-legal nature*)

The undermentioned autopsies were performed during the year.

Cause of Death.	*Number of Cases.*	
Lobar pneumonia	2	(Miliary 1.)
Tuberculosis	4	(Lungs 2.) (Peritoneum 1.)
Malignant disease		(Carcinoma of Breast) 1.
		(Carcinoma of Stomach) 1.
Antimony poisoning	1	
Emaciation	1	
Pneumococcal abscess of brain	1	
Pneumococcal peritonitis	1	
Pneumococcal meningitis	1	
Cerebral malaria	1	
Cirrhosis of liver and polyserositis	1	
General paralysis of the insane	1	
Cysticercus cellulosae, infestation of brain	1	
No cause ascertained	1	

SECTION (5) THE MEDICAL MUSEUM.

New premises in the old Native Hospital have been taken over and converted into a museum which is now sufficiently large to warrant division into three sections, pathological, medico-legal and public health.

The object of the establishment of the museum is the eventual provision of a collection of specimens illustrating the pathology of the country, the local insect vectors of diseases, the local plants of medicinal and toxicological importance and witchcraft. Preventive medicine has not been neglected and a series of models illustrating sanitation schemes for village, plantations and townships have been constructed by Mr. Chapman, the Sanitary Superintendent, Zomba. Several hundreds of specimens are already on view, and it is hoped that shortly the museum will prove both a centre of interest and education for the medical practitioners resident in this country.

SECTION (6) MEDICO-LEGAL SECTION.

(*a*) This branch of laboratory work assumes added importance almost daily.

Medico-legal examinations.

The following examinations were undertaken during the year.

Poison analyses	175
Histological examinations of tissues	9
Examination of seminal stains	6
Examination of blood stains	46
Precipitin tests for human blood	44
Blood grouping tests of stains	21
Examination of suspected human remains	122
Plant identifications	20
Examination of miscellaneous exhibits	50
Autopsies	19

Routine adopted in the Examination of Stains for the presence of Human Blood.

As a preliminary a simple guiacum test is tried, when, if positive a test for haemochromogen crystals using Takayama's solution is made, followed by the spectroscopic test for haemochromogen; the same specimen being used and thus the material conserved. The haemin crystal test is not used as it has proved too unreliable, and on several occasions gave negative results with definite blood stains. The haemochromogen test on the other hand, is more certain and enables one to observe not only the specific crystals but also the specific spectrum, using the same specimen and thus conserving material and time.

The technique of the precipitin test in this laboratory, follows with certain modifications the recommendations of Dr. Roche Lynch as published in "The Analyst," January, 1928. Assuming that the stain has already been proved to be blood, a portion of it as near as possible equivalent to one drop of blood, is placed into a small tube and covered with 6 c. c. of saline (thus giving a dilution of approximately 1 in 100). The tube with its contents is now placed in the ice chest for 24 hours, to enable the stain to dissolve. After the period mentioned, the fluid is withdrawn from the tube when if not clear it is filtered; the reaction of the fluid is next tested and if necessary adjusted to neutral by either N/10 NaOH, or N/10 HCL. Dilutions of the stains are then made and put up in Wassermann tubes as follows, 1/100, 1/1000, 1/5000, 1/10,000, 1/20,000 and to 0.9 c.c. of each stain extract is added 0.1 c.c. of the appropriate antiserum. The tubes are allowed to stand for twenty minutes at room temperature and then the readings are made.

Controls are made of antiserum and saline, antiserum and a saline extract of a portion of the article under examination which is free from blood, antiserum and a known human blood, and antiserum and animal blood (any animal likely to be put forward by the defence).

Medico-Legal Autopsies.

The following were the causes of death ascertained at autopsies during the year.

(1) Comminuted fracture of the skull following a homicidal attack.
(2) Cerebral malaria. (In this case death was alleged to be due to poisoning).
(3) Suicidal hanging.
(4) Shock due to severe external injuries.
(5) Mesenteric thrombosis.
(6) Broncho-pneumonia, pericarditis and peritonitis.
(7) Suicidal hanging.
(8) Suicidal hanging.
(9) Broncho-pneumonia, bronchiectasis and peritonitis.
(10) Sub-dural intracranial haemorrhage following injury.
(11) Irritant poisoning.
(12) Haemorrhage following injury to an abdominal viscus.
(13) Rupture of the spleen following a blow on the abdomen,
(14) Shock following sudden immersion in cold water.
(15) Suicidal hanging.
(16) Shock following violent assault.
(17) Multiple severe external injuries following a violent assault.
(18) Shock following severe external injuries to the genitalia.

It will be noted that four cases of suicidal hanging occurred, a method of committing suicide which seems to be increasingly common in members of the African community.

Examination of Suspected Human Remains.

[122 human remnants were examined.]

An interesting case occurred in the Chiradzulu district, where a native male was charged with holding an ordeal by poison. His house was searched, and all the apparatus and drug containers of a witch doctor were discovered in the vicinity of the dwelling. On making a close examination of the contents of the medicine pots, the following were discovered, 1 skull, 3 pelvic bones, 1 sacrum, 6 long bones, 1 mandible, 7 ribs, 3 tracheae, the bones of an infant, some foetal bones, 25 fragments of adult long bone, some teeth, human flesh, testicles, jackal hairs and a baby's scalp. These specimens were mixed up in a black oily fluid consisting of castor oil, charcoal, *mwabve* bark, blister beetles, and bag worms. From the examination of the human remains mentioned above it was ascertained that the medicine pots contained remnants of six different individuals, one young African female aged approximately 17 years, one adult male over 18 years, one African female over 22 years, one child nineteen inches long and probably a few weeks old, and two human foetuses.

It was discovered by the magistrate that there were several people missing in his district including a woman and her newly born child. The man was accordingly tried, and when confronted with the above evidence he made no attempt to dispute it, but just stated that he did not kill the people but merely collected their bones. Further information however, brought to light the fact that the man was cannibalistic. He was convicted and sentenced to 10 years hard labour.

Analysis of Viscera. Witch Doctors' Outfits.

Two fatal cases of poisoning by arsenic occurred. The first subject was a dipping tank labourer at Karonga, and the second was a village native from Chiradzulu.

During the year many witch doctors' outfits were examined in detail. The same type of equipment appeared to be common to all, and mentioned below is an example of such an outfit: one divining rod, the cranial bones of a chameleon, various packets of "medicine" enclosed in leaves, such as charcoal and the crushed stem of the plant *Euphorbia candelabrum*; charcoal, millet seeds and castor oil beans; ant hill earth and the crushed bark of the tree *Erythroplcum guinense*, charcoal mized with powdered glass and bamboo hairs and the bag worm, *Gymnclema vinctus*; charcoal, castor oil, and crushed "cantharid" beetles, etc., etc,

In one outfit sent for examination the prescription book written by the owner was present. This contained much worthless information but some of the recipes proved of interest, in particular one for the treatment of fibrositis and rheumatism by the inunction of the following:— *nyesi*, (a fish which gives an electric shock on being touched), crushed head of a snake, and the stings of bees. Mix together, and rub into small incisions made in the region of the painful tissue. It will be noted that bee venom was apparently being used as a therapeutic agent for the treatment of "rheumatic" conditions, a mode of treatment which has recently come into favour in European medicine.

Various other recipes were mentioned for such matters, as to stimulate a desire to seduce women, to produce abortion, to stop a threatened abortion, and to kill a man.

Section (7) Courses of Instruction.

(*A*) *Training in Laboratory Work.*

Six-separate courses were given in elementary laboratory work during the year to members of the African subordinate staff. At the termination of each course an examination was held. It is too early to make any useful comments on the value of the training but several of the candidates proved sufficiently intelligent to be of some help.

The course is so arranged that it is essentially practical and lectures and demonstrations are given covering the under-mentioned syllabus:—

Method of cleaning slides, cover-slips and pipettes; the metric system of weights and measures; percentage solutions; the characteristics of the normal blood cells and blood platelets; a detailed description of the malarial parasites; the recognition of trypanosomes, treponemata, and microfilariae; artefacts in blood films; the recognition of the common helminths and protozoa met with in the faeces; the method of staining a pus smear, urethral smear, and urine smear; the preparation of a smear of sputum for examination for acid fast bacilli; the method of obtaining the material and making an examination for the presence of Hansen's bacillus; Gram's stain, its value and the method of application; a simple classification of elementary bacteria; the routine examination of a specimen of urine; the method of obtaining a sample of blood serum; the structure of the microscope; the staining of smears by Fontana's method; the names of common articles used in a laboratory.

(*B*) *Course for Police Officers in Forensic Medicine.*

Arrangements were made with the approval of the Director of Medical Services and the Chief Commissioner of Police, for a course of lectures and demonstrations to be given to officers of the Police. These lectures covered those branches of forensic medicine having a definite bearing on the detection of crime.

The syllabus of the course was as follows:

Introductory; blood examination; composition of blood; chemical examination of blood stains; spectroscopic examination of blood stains; differentiation of blood stains from metallic stains etc.; blood groups and their evidential value; the precipitin test for human blood; seminal stains, method of examination and the evidential value of same; differences between animal and human excrement; differentiation of animal hairs; post-mortem examinations and the possible value of same; wounds and injuries; differentiation on general grounds of accident, suicide and murder; firearm wounds; the examination of projectiles; rape and unnatural sexual offences; action of poisons in a general way; common poisons used by natives; preservation of organs, etc., for the purpose of examination for poisons; the African native as a criminal.

Section (8) Miscellaneous.

The following features of special interest were noted during the year.

Taenia saginata parasitised by Hookworms.

During an autopsy performed on an emaciated native male of advanced years, a live tapeworm (*T. saginata*), was recovered from his alimentary tract. Close examination of the helminth revealed the interesting fact that it was parasitised by hookworms which were securely attached to the cuticle. A portion of the tape worm about six inches distal to the head had two hookworms attached quite close to each other. The specimen was removed and preserved in the museum. The species of hookworm concerned was *N. americanus*.

Schistosomiasis of the Vermiform Appendix.

Histological examination of four appendices revealed the presence of numerous ova of *S. haematobium*. One of the patients concerned was an adult native male who developed signs of appendicular trouble and was operated with a successful issue. His appendix was almost a solid mass of schistosome eggs, many of which could be seen invading the lumen of the viscus.

Pneumococcal Infections in Natives.

It is an interesting fact that in over 19% of post-mortems performed during the year under review, the subjects had died as a direct result of pneumococcal infections. This circumstance supports the opinion commonly held that the natives possess only limited resistance to the ravages caused by this organism.

The cases occurred sporadically, apart from any endemic, and two of them were sent for investigation by the police as it was thought that death was most probably due to poisoning. The incidence of the various infections, was as follows:

Lobar-pneumonia	2.
Pneumococcal abscess of the brain	1.
Pneumococcal peritonitis	1.
Pneumococcal meningitis	1.
Broncho-pneumonia and peritonitis	2.

Illustrative cases were:—

(1) An aged and emaciated male died suddenly. Foul play was suspected. Autopsy revealed a massive generalised peritonitis with a layer of pus about ½ inch thick and the colour of butter over the parietal peritoneum. There were recent adhesions between the coils of intestine, and about 3 pints of tea coloured free fluid. Examination of the pus and the exudate showed the presence of large numbers of pneumococci.

(2) This subject was a male native aged 32 years. He was a sergeant in the local regiment of the King's African Rifles, a man of splendid physique. Some hours previous to his death he complained of not feeling well and was admitted into hospital, where he died. At autopsy he was found to have broncho-pneumonia, pericarditis and peritonitis and the pneumococcus was isolated from samples of the exudates.

The remaining cases, which it is unnecessary to detail in full, were just as dramatic in onset and termination as the above mentioned, and it thus suggests that in all cases of sudden and unexpected death occurring in natives, the possibility of a virulent pneumococcal infection must be thought of.

General Paralysis of the Insane.

An autopsy was performed on a middle aged native male, who had been admitted into the Central Lunatic Asylum in a paralytic condition some months previously. The membranes of the brain ware markedly thickened, the pia arachnoid was oedematous, the convolutions were atrophied, excess cerebro-spinal fluid was present, the meninges were adherent to the cerebral substance at various points, and the lateral ventricles were dilated and contained an excess of fluid. Histological sections of the cortex stained by Levaditi's method revealed the presence of numerous *Treponema pallida.*

Anaemia in European Women.

It does not appear to be sufficiently well known that European women resident in this country tend to become increasingly anaemic. The cause of such blood poverty is by no means clear, but as the condition definitely predominates in women, it is conceivable that the modern craze for "stream lines" may play a part in the origin of such a disturbance. Dr. W. K. Blackie has previously drawn attention to the occurrence of similar cases in Salisbury, Southern Rhodesia.

The following are illustrative cases:—

(1) Married lady, aged 43 years, complains that for some weeks she has felt run down and tired and now cannot walk more than half a mile without feeling breathless.

History and physical examination revealed nothing of any importance. Test meal was refused.

Blood examination.

Erythrocytes	3,930,000 per c.mm.
Leucocytes	8,000 ,, ,,
Haemoglobin	95%.
Colour index	1+.
Reticulocytes	½%.

Macrocytosis, anisocytosis, poikilocytosis, polychromasia present.

Diagnosis: Macrocytic anaemia.

(2) Married lady aged 45 years. Complains that for some months, she has been getting progressively weaker and more tired and that recently she has felt some numbness in her legs.

Recently she has been taking liver extract on the advice of a friend.

History and physical examination revealed nothing of note. The lady refused a test meal.

Blood examination.

Erythrocytes	4,900,000 per cu.mm.
Leucocytes	12,000 ,, ,,
Haemoglobin	80%.
Colour index	0.8
Reticulocytes	4.5%.

Macrocytosis, anisocytosis, poikilocytosis, polychromasia and a few normoblasts, present.

Diagnosis : Macrocytic anaemia.

(3) Married lady, aged 55 years, complains of a sore tongue, eczema of the vulva, and weakness of several months duration.

History and physical examination revealed nothing of note. The lady refused the offer of a test meal.

Blood examination.

Erythrocytes	3,560,000 per cu.mm.
Leucocytes	12,500 ,, ,,
Haemoglobin	75%.
Colour index	1+.
Reticulocytes	1%.

Macrocytosis, anisocytosis, poikilocytosis present.

Diagnosis : Macrocytic anaemia.

SECTION (9) INVESTIGATIONS.

The Alcoholic Content of the Common Native Beer.

The object of this investigation was to ascertain the maximum alcoholic content of the average native brew of beer. Arrangements were made with a recognized native brewer to prepare several pots of beer in the laboratory. Maize and millet were used in the manufacture, which required three days for the completion of the process It was stated by my chosen native tasters, that the beer was ready to drink on the morning of the fourth day, and they agreed that the brew was of excellent quality. Each morning for seven days, the alcohol was obtained from one litre of the filtered beer by a process of fractional distillation. Several different brews were tested and the average alcoholic content obtained, with the undermentioned results :

1st	day for drinking the beer contained	1.5%	alcohol.
2nd	,, ,, ,, ,, ,, ,,	2.7%	,,
3rd	,, ,, ,, ,, ,, ,,	3.5%	,,
4th	,, ,, ,, ,, ,, ,,	6.0%	,,
5th	,, ,, ,, ,, ,, ,,	4.2%	,,
6th	,, ,, ,, ,, ,, ,,	3.7%	,,
7th	,, ,, ,, ,, ,, ,,	2.7%	,,

The beer thus increases in strength progressively, reaching its maximum alcoholic content on the 4th day, after which a steady decline in concentration occurs until by the 7th day it contains only 2.7% of alcohol. This diminution in content is due to the splitting up of the alcohol by various organisms, with the formation of lactic, butyric and acetic acids.

Examination of the Intestinal Contents of flies for the Presence of Cysts of Entamoeba histolytica.

1,000 flies found in the vicinity of native latrines in Zomba township were examined. The alimentary tract of each fly was dissected out, and thoroughly ground up in saline. The emulsion formed was then examined microscopically, in all cases with a negative result.

Examination of the Small Domestie Cockroach for the presence of Cysts of Entamoeba histolytica.

Several hundreds of cockroaches were examined by dissection of the alimentary tract, as mentioned above. In nearly 99% of these a protozoon was observed which appeared to be akin in its morphological features to *Entamoeba histolytiea*, and this being so, concentrated emulsions of cockroach intestinal contents containing the amoebae referred to above were prepared and injected per rectum into kittens, without however the production of any pathological results. It is probable therefore, that the protozoon concerned was *Endamoeba blattae.*

Returns.

TABLE I. STAFF.

EUROPEAN.

A. D. J. B. Williams, O.B.E.,	Director of Medical Services.
H. H. B. Follit	Senior Health Officer.
W. A. S. Lamborn, O.B.E.,	Medical Entomologist.
R. Calleja	Senior Medical Officer.
H. M. Shelley	Pathologist.
H. G. FitzMaurice	Medical Officer.
T. A. Austin	,, ,,
W. H. Watson	,, ,,
W. L. Gopsill	,, ,,
P. P. Martyn	,, ,, (Resigned 1. 6. 1935).
F. O. W. A. Mahon-Daly	,, ,,
L. C. Mayne	,, ,,
P. J. Bourke	,, ,,
R. N. Wilcox	,, ,,
E. J. Blackaby	,, ,,
H. D. Cronyn	,, ,,
D. P. Turner	,, ,, (Seconded to Somaliland Protectorate 1. 10. 1935).
C. H. Howat	,, ,,
R. A. Newsom	,, ,,
Miss K. R. Cameron, M.B.E.,	Matron.
Miss N. M. Cremen, M.B.E.,	Nursing Sister.
Miss H. M. Phillips	,, ,,
Mrs. N. K. Clemence	,, ,,
Miss M. E. S. Cumming	,, ,,
Miss H. C. Potter	,, ,,
Miss S. Johnson	,, ,,
Miss E. F. McConachy	,, ,,
Miss B. Wells	,, ,,
Miss E. M. R. D. Davies	,, ,,
Miss F. McQuire	,, ,, (Resigned 14. 9. 1935).
Miss R. P. Harrison	,, ,, (Appointed 22. 11. 1935).
R. W. G. Pegg	Clerk and Medical Storekeeper.
V. T. Smithyman	Junior Clerk. (Temporary).
W. A. Willox	Sanitary Superintendent.
F. E. Weaver	,, ,,
F. L. Chapman	,, ,, (Temporary).

ASIATIC.

B. T. Lele	Civil Sub-Assistant Surgeon.
Lakhpat Singh	,, ,, ,, ,,
S. S. Kokari	,, ,, ,, ,,
G. K. Joshi	,, ,, ,, ,, (Appointed 15. 3. 1935).
P. D. Jhala	,, ,, ,, ,, (Temporary).
G. D. Kashap	Subadar. I. M. D., Sub-Assistant Surgeon.
B. Prasad	Jemadar ,, ,, ,, ,,
R. L. Datta Abdali	,, ,, ,, ,, ,, ,, (reverted to military duties 3. 8. 1935.
Dalip Singh	Jemadar I. M. D. Sub-Assistant Surgeon. (reverted to military duties 25. 12. 1935).
Bansi Lal	Jemadar, I. M. D., Sub-Assistant Surgeon.

AFRICAN (Principal Members).

*T. D Duncan...	Senior Hospital Assistant, died 17. 4. 1935.
*Leonard Makolera	Hospital Assistant.
Moses Kaundey	,, ,,
*Godwin Maulidi	,, ,,
Elliott Taumbe	,, ,,
Leonard Mphamba	,, ,, (retired 19. 10. 1935).
Dyson David	,, ,,
*Fred Nyirenda	,, ,,
Harry M. Thomson	,, ,,
Radford Botha	,, ,,
Rabson German	Laboratory Assistant
Lawrence M'Manga	Clerk First Grade (Retired 1. 6. 1935).
Isaiah M. Jere	,, ,, ,,
Austin Maosa	,, ,, ,, (Retired 31. 12. 1935).
Hudson B. Chamba	,, ,, ,, (Appointed 1. 4. 1935).
E. E. Mothello	,, ,, ,, (Appointed 1. 6. 1935).
MacAuslin Chemboga	Sanitary Inspector First Grade.

*Passed examination for Senior Hospital Assistant.

TABLE II.—FINANCIAL.

(See Section I C.)

TABLE III.

RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1935.

	Europeans and Whites	Africans	Asiatics
Number of Inhabitants 1935 ...	1,781	1,600,076	1,400
Number of Births, 1935 ...	44	—	63
Number of Deaths, 1935 ...	11	—	16
Number of Immigrants, 1935	—	—	—
Number of Inhabitants, 1934	1,800	1,600,713	1,401
Increase of population			
Decrease of population	19	637	1

TABLE IV.

Showing the Maximum, Minimum, and Mean Temperatures (Fahr.) and Total Rainfall in Various Districts during the Year 1935.

District.	Station.	Height above Sea Level.	Air Temperature.							Rain.			
			Means of		Mns. of	Absolute Max. and Min.				Number of Days.	Total Fall Inches.	Maximum Fall in a Day.	
			A Max.	B Min.	A&B	Max.	Date.	Min.	Date.			Inches.	Date.
		Feet.											
Lower Shire	Port Herald	115	97·7	72·2	85·0	110	6 Oct.	57	26 June	55	35·69	4·30	7 Dec.
.. ..	Port Herald Experimental Station	130	88·5	68·4	78·5	109·5	9 Nov.	50·5	4 July	74	36·80	2·96	16 Jan.
Chikwawa	Chikwawa	127	90·2	65 8	78·0	114	26 Oct.	44	11 June	54	27·33	2·90	23 „
Cholo	Cholo	3,000	79·9	58·5	69·2	99	21 „	44	7 Aug.	103	55·10	3·10	10 Nov
Mlanje	Mlanje	2,400	79·5	64·1	71·8	96	31 „	44	19 Oct.	102	75·00	3·50	20 Dec.
Blantyre	Blantyre	3,500	76·8	59·6	68·2	90	29 „	47	7 Aug.	64	45·95	2·98	16 Jan.
Zomba	Zomba	3,020	77·2	60·3	68·8	93	28 „	48	30 July	111	59·96	4·52	22 March
Upper Shire	Liwonde	1,600	83·8	47·7	65·8	98	22 „	29	15 June	52	29·61	3·55	31 Jan.
Ncheu	Ncheu	3,700	72·9	53·7	63·3	97	29 „	41	5 Aug.	79	25·57	2·60	25 March
South Nyasa	Fort Johnston	1,700	87·6	64·9	76·3	102	28 „	40	5 Aug.	34	16·27	1·44	3 Feb.
Dedza	Dedza	5,250	72·7	51.6	62·2	87	9 Nov.	36	7 Aug.	52	33·81	2·15	20 Dec.
Lilongwe	Lilongwe	3,400	—	—	—	—	—	—	—	58	18·50	1·64	16 Jan,
Fort Manning	Fort Manning	4,228	80·8	54·4	67·6	97	6 Nov.	36	4 Aug.	60	28·35	2·20	1 April
Dowa	Dowa	4,400	83·6	61·7	72·7	96	29 Oct.	40	10 July	69	26·15	1·92	25 Nov.
Marimba	Kota-Kota	1,800	86·9	—	—	102	29 „	—	—	78	40·18	2·57	7 Dec.
Kasungu	Kasungu	3,500	—	—	—	—	—	—	—	51	27·67	3·08	23 March
Mombera	Mzimba	4,500	78·4	57·6	68·0	89	29 Oct.	30	3 July	55	28·59	2·90	22 April
Domira Bay	Domira Bay	2,000	82·3	63·8	73·1	96	29 „	46	10 Aug.	57	23·38	3·00	6 Feb.
West Nyasa	Chinteche	1,800	86·0	62·5	72·3	103	4 Nov.	50	11 July	86	80·13	7·50	24 April
North Nyasa	Karonga	1,800	88·2	68·9	78·6	99	8 Sept.	56	28 Aug.	59	40·02	3·00	26 Feb.

TABLE V.

TABLE Va.—ZOMBA AND BLANTYRE EUROPEAN HOSPITALS.

RETURN OF DISEASES AND DEATHS (EUROPEAN IN-PATIENTS) FOR THE YEAR 1935.

Diseases.	Remaining at the end of 1934	Admissions during 1935.		Total Cases Treated.	Deaths.	Remaining at the end of 1935
		Zomba.	Blantyre.			
I. *Epidemic, Endemic and Infectious Diseases :*						
1. Enteric group :—						
Type not defined ..	—	3	—	3	—	2
2. Typhus ...	—	—	1	1	—	1
5. Malaria :—						
Tertian (benign) ..	—	2	2	4	—	—
Aestivo-autumnal ...	1	6	2	9	—	1
Blackwater fever ...	—	—	1	1	1	—
Type not defined ...	—	1	10	11	—	—
7. Measles ...	—	1	—	1	—	—
16. Dysentery :—						
Amoebic ...	3	13	12	28	—	1
21. Erysipelas ...	—	—	1	1	—	—
36. Tuberculosis of other organs :—						
Genito-urinary system ...	—	—	1	1	—	—
41. Septicaemia ...	—	1	—	1	—	1
II. *General Diseases not mentioned above :*						
46. Cancer or other malignant tumours of the female genital organs ...	—	—	1	1	—	—
50. Tumours (non-malignant) :—						
Cyst ...	—	—	1	1	—	—
52. Chronic Rheumatism ...	—	—	2	2	—	—
58. Anaemia :—						
Pernicious ...	—	1	—	1	—	—
66. Alcoholism ...	1	1	1	3	—	—
69. Other general diseases :—						
Acidosis ...	—	—	1	1	—	—
III. *Affections of the Nervous System and Organs of the Senses :*						
82. Sciatica ...	—	2	—	2	—	—
85. Diseases of the eye and annexa	—	1	—	1	—	—
IV. *Affections of the Circulatory System :*						
90. Other diseases of the heart :—						
Myocarditis ...	—	—	1	1	1	—
91. Diseases of the arteries :—						
Arterio-sclerosis ...	—	1	1	2	—	—
V. *Affections of the Respiratory System :*						
99. Bronchitis :—						
Acute ...	—	1	2	3	—	—
Chronic ...	—	1	—	1	—	—
100. Broncho-pneumonia ...	—	—	1	1	1	—
101. Pneumonia :—						
Lobar	—	1	—	1	—	—
105. Asthma ...	—	—	1	1	—	—
VI. *Diseases of the Digestive System :*						
108 A. Diseases of the buccal cavity and annexa :—						
Dental caries ...	—	—	7	7	—	
Carried forward	5	36	49	90	3	6

TABLE Va.—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935.		Total Cases Treated.	Deaths.	Remaining at the end of 1935
		Zomba.	Blantyre.			
Brought forward ...	5	36	49	90	3	6
109. Affections of the pharynx and tonsils :—						
Tonsillitis ...	—	4	4	8	—	—
111. A. Ulcer of the stomach ...	—	—	1	1	—	—
B. Ulcer of the duodenum ...	—	—	2	2	—	—
112. Other affections of the stomach :—						
Gastritis ...	—	2	1	3	—	—
113. Diarrhoea and enteritis :—						
Under two years ..	—	—	2	2	1	—
114. Diarrhoea and enteritis :—						
Two years and over ...	1	—	3	4	—	—
Colitis ...	—	1	—	1	—	—
117. Appendicitis ...	—	—	7	7	—	—
VII. *Diseases of the Genito-urinary System (non-venereal)* :						
131. Other affections of the kidneys :—						
Pyelitis ...	—	1	—	1	—	—
136. Diseases (non-venereal) of the genital organs of man :—						
Phimosis ...	—	—	3	3	—	—
141. A. Metritis ...	—	—	1	1	—	—
B. Other affections of the female genital organs :—						
Ovaritis ...	—	—	1	1	—	—
Menorrhagia ...	—	—	2	2	—	—
VIII. *Puerperal State* :						
143. A. Normal labour ...	—	6	12	18	—	1
B. Other accidents of pregnancy :—						
Vomiting ...	—	2	2	4	—	2
Ante-partum haemorrhage ...	—	1	—	1	—	—
Other accidents of pregnancy	—	—	1	1	—	—
145. Other accidents of parturition ...	—	1	2	3	—	—
IX. *Affections of the Skin and Cellular Tissues* :						
153. Abscess ...	—	1	—	1	—	—
Cellulitis ...	—	2	8	10	—	1
154. Other diseases of the skin :—						
Herpes ...	—	1	1	2	—	—
Chiggers ...	—	—	1	1	—	—
X. *Diseases of Bones and Organs of Locomotion (other than Tuberculous)*:						
155. Diseases of the bones :—						
Periostitis ...	1	—	—	1	—	—
158. Other diseases of bones or organs of locomotion :—						
Bursitis ...	—	1	—	1	—	—
Lumbago ...	—	—	1	1	—	—
XII. *Diseases of Infancy* :						
160. Congenital debility ...	—	—	1	1	—	—
XIV. *Affections produced by External Causes* :						
175. Food poisoning ...	—	1	1	2	—	—
Carried forward ...	7	60	106	173	4	10

TABLE Va.—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935.		Total Cases Treated.	Deaths.	Remaining at the end of 1935
		Zomba	Blantyre			
Brought forward	7	60	106	173	4	10
179. Burns (other than by fire) ...	—	1	—	1	—	—
188. Wounds (crushing e.g., rail accident, etc.) ...	—	—	1	1	—	—
189. Injuries inflicted by animals, (bites, kicks, etc.) ...	—	1	—	1	—	—
201. Dislocation ...	—	1	2	3	—	—
Fracture ...	1	—	2	3	—	—
202. Other external injuries :						
Abrasions ...	—	—	2	2	—	—
XV. *Ill-defined Diseases :*						
205 A.—Diseases not already specified or ill-defined :—						
Asthenia or debility ...	—	—	1	1	—	1
Diseases not diagnosed ...	—	—	1	1	—	—
Total ...	8	63	115	186	4	11

TABLE V.

Table Vb. Return of Diseases and Deaths (Native In-Patients) for the Year 1935.

(Including Asiatics, Native Officials, K. A. R. Native Ranks, Native General Population, Asiatic and Native Convicts).

Diseases.	Remaining at the end of 1934	Admissions during 1935	Total Cases Treated	Deaths.	Remaining at the end of 1935.
I. *Epidemic, Endemic and Infectious Diseases* :					
1. Enteric Group :—					
Typhoid fever	—	2	2	—	2
Type not defined	—	1	1	—	1
3. Relapsing fever	1	79	80	—	6
5. Malaria :—Tertian (benign)	—	58	58	—	—
Quartan	—	16	16	—	—
Aestivo-autumnal	9	315	324	8	5
Cachexia	—	29	29	1	1
Blackwater fever	—	3	3	2	—
Type not defined	8	301	309	5	23
6. Smallpox	1	—	1	—	—
7. Measles	2	76	78	—	3
9. Whooping cough	1	24	25	4	2
11. Influenza	4	124	128	—	2
13. Mumps	—	1	1	—	—
16. Dysentery :—Amoebic	10	108	118	2	2
Bacillary	—	1	1	—	—
Undefined	1	12	13	3	—
20. Leprosy	14	39	53	1	11
21. Erysipelas	—	2	2	2	—
22. Acute poliomyelitis	—	1	1	—	—
24. Epidemic cerebro-spinal fever	—	1	1	—	—
25. Other epidemic diseases :—Rubeola	—	53	53	—	3
Varicella	—	56	56	—	3
Yaws	5	189	194	1	11
Trypanosomiasis.	1	2	3	1	2
28. Hydrophobia	—	1	1	—	—
29. Tetanus	—	3	3	3	—
30. Mycosis	—	4	4	—	—
31. Tuberculosis, pulmonary and laryngeal	3	81	84	13	5
32. Tuberculosis of the meninges or central nervous system	—	2	2	1	—
33. Tuberculosis of the intestines or peritoneum	—	4	4	2	—
34. Tuberculosis of the cerebral column	1	13	14	1	—
35. Tuberculosis of the bones and joints	2	10	12	1	2
36. Tuberculosis of other organs :—					
Skin	1	4	5	—	1
Lymphatic system	—	11	11	—	1
Genito-urinary system	1	3	4	1	—
38. Syphilis :—Primary	12	342	354	1	42
Secondary	25	397	422	2	47
Tertiary	4	36	40	1	3
Hereditary	1	38	39	2	2
Period undefined	2	31	33	—	—
39. Soft chancre	—	3	3	—	—
40. A. Gonorrhoea and its complications	12	298	310	1	17
B. Gonorrhoeal ophthalmia	1	5	6	—	—
C. ,, arthritis	2	5	7	—	2
41. Septicaemia	—	4	4	3	—
42. Other infectious diseases :—Filariasis	—	5	5	—	—
Unclassified	5	—	5	—	—
II. *General Diseases not mentioned above* :					
43. Cancer or other malignant tumours of the buccal cavity	—	2	2	—	—
44. Cancer or other malignant tumours of the stomach or liver	—	3	3	3	—
46. Cancer or other malignant tumours of the female genital organs	—	2	2	—	1
Carried forward	129	2,800	2,929	65	200

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935.	Total Cases Treated	Deaths	Remaining at the end of 1935.
Brought forward	129	2,800	2,929	65	200
47. Cancer or other malignant tumours of the breast ...	—	2	2	1	—
48. Cancer or other malignant tumonrs of the skin ...	—	6	6	1	3
49. Cancer or other malignant tumours of organs not specified ...	—	6	6	—	—
50. Tumours (non-malignant) :—					
Adenoma ...	—	21	21	1	1
Lipoma ...	—	9	9	—	—
Cyst	—	11	11	—	1
Dermoid cyst ...	—	1	1	—	—
Osteoma ...	—	1	1	—	—
Papilloma ...	—	2	2	—	—
Sebaceous cyst ...	—	5	5	—	—
Unspecified ...	5	2	7	—	—
51. Acute rheumatism ...	—	4	4	—	1
52. Chronic rheumatism ...	2	29	31	1	—
53. Scurvy ...	—	3	3	—	—
54. Pellagra	4	20	24	—	4
55. Beriberi ...	—	1	1	—	—
56. Rickets ...	—	1	1	—	—
58. Anaemia :—Other anaemias ...	—	5	5	—	—
60. Diseases of the thyroid gland :—					
Exophthalmic goitre ...	—	1	1	—	—
Other diseases of the thyroid gland ...	—	8	8	—	—
64. Diseases of the spleen :—Abscess ...	—	1	1	—	—
Rupture ...	—	1	1	—	—
Splenitis ...	—	5	5	—	1
Other diseases ...	—	1	1	—	—
65. Leukaemia ...	1	1	2	—	—
Hodgkin's disease ...	—	4	4	—	—
66. Alcoholism ...	—	3	3	—	—
III. *Affections of the Nervous System and Organs of the Senses :*					
70. Brain abscess ...	—	1	1	1	—
71 Meningitis (not including tuberculous or cerebro-spinal meningitis) ...	—	2	2	2	—
73. Other diseases of the spinal cord :—					
Myelitis ...	—	1	1	1	—
Spastic paraplegia	—	3	3	—	—
74. Apoplexy :—Haemorrhage ...	—	1	1	1	—
Thrombosis ...	—	1	1	—	—
75. Paralysis :—Hemiplegia ...	1	10	11	1	2
Other paralyses ...	—	18	18	1	1
76. General paralysis of the insane ...	1	—	1	—	—
77. Other forms of mental alienation :—					
Dementia ...	—	3	3	—	—
Melancholia	—	2	2	—	—
Mania ..	—	1	1	—	—
Idiocy ...	—	3	3	1	—
Delusional insanity ...	—	4	4	—	—
Other mental diseases ...	2	3	5	—	2
78. Epilepsy	3	36	39	1	4
82. Hysteria ...	—	1	1	—	—
Neuritis ...	—	8	8	—	—
Neurasthenia ...	—	2	2	—	—
Intercostal neuralgia ...	—	1	1	—	—
Migraine ...	—	3	3	—	—
Neuralgia ...	—	15	15	—	—
Sciatica ...	—	12	12	—	—
Carried forward	148	3,085	3,233	78	220

TABLE Vb—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935.	Total Cases Treated	Deaths.	Remaining at the end of 1935
Brought forward	148	3,085	3,233	78	220
85. Diseases of the eye and annexa :—					
Blepharitis ...	—	2	2	—	—
Cataract ...	1	27	28	—	5
Conjunctivitis ..	6	188	194	—	8
Foreign body ...	—	4	4	—	—
Glaucoma ...	—	3	3	—	1
Optic neuritis ...	—	1	1	—	—
Stye ...	—	4	4	—	—
Tumour ...	—	6	6	—	—
Ulcer of cornea ...	1	25	26	—	1
Other diseases ...	5	31	36	—	2
86. Affections of the ear and mastoid sinus :—					
Mastoiditis ...	—	3	3	1	—
Otorrhœa ...	—	18	18	—	—
Otitis ...	1	17	18	—	—
Unclassified ...	—	2	2	—	—
IV. *Affections of the Circulatory System :*					
87. Pericarditis ...	—	2	2	—	—
90. Other diseases of the heart :—					
Valvular ...	1	17	18	3	—
Myocarditis ...	—	5	5	2	1
Disordered action ...	—	1	1	—	—
92 Embolism or thrombosis (non-cerebral) ...	—	1	1	—	—
93. Diseases of the veins :—					
Haemorrhoids ...	—	10	10	—	1
Phlebitis ...	—	7	7	—	—
94. Diseases of the lymphatic system :—					
Lymphangitis ...	—	4	4	—	1
Lymphadenitis (non-specific) ...	—	24	24	—	1
95. Haemorrhage of undetermined cause :—					
Epistaxis ...	—	1	1	—	—
V. *Affections of the Respiratory System :*					
97. Diseases of the nasal passages :—Rhinitis ...	—	1	1	—	—
Coryza ...	—	16	16	—	—
98. Affections of the larynx :—					
Laryngitis ...	—	2	2	—	—
99. Bronchitis :—Acute ...	1	97	98	1	2
Chronic ...	—	23	23	—	—
100. Broncho-pneumonia ...	1	75	76	16	3
101. Pneumonia :—Lobar	4	101	105	22	—
Unclassified ...	—	4	4	—	—
102. Pleurisy, Empyema ...	—	8	8	—	—
Other pleurisies ...	—	25	25	—	—
105. Asthma ...	—	22	22	—	—
107. Other affections of the respiratory system :—					
Pleurodynia ...	—	3	3	—	—
Abscess of lung ...	—	1	1	1	—
VI. *Diseases of the Digestive System :*					
108. A. Diseases of the buccal cavity and annexa :—					
Dental caries ...	—	6	6	—	—
Alveolar abscess ...	—	4	4	—	—
Pyorrhœa ...	—	12	12	—	1
B. Stomatitis ...	1	12	13	—	—
Glossitis ...	—	3	3	—	—
109. Affections of the pharynx or tonsils :—					
Pharyngitis ...	1	2	3	—	—
Tonsillitis ...	2	38	40	2	2
Other diseases ...	—	1	1	1	—
Carried forward	173	3,944	4,117	127	249

TABLE V·b.—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935	Total Cases Treated	Deaths	Remaining at the end of 1935.
Brought forward	173	3,944	4,117	127	249
111 A. Ulcer of the Stomach ...	—	1	1	1	—
B. Ulcer of the duodenum ...	—	2	2	1	—
112. Other affections of the stomach :—					
Gastritis ...	—	7	7	—	—
Dyspepsia	1	16	17	—	1
113. Diarrhoea and enteritis :—					
Under two years ...	1	15	16	—	—
114. Diarrhoea and enteritis :—					
Two years and over ...	—	33	33	2	2
Colic ...	—	7	7	—	1
Colitis ...	—	16	16	—	—
Ulceration ..	—	1	1	1	—
115. Ankylostomiasis ..	34	1,041	1,075	11	45
116. Diseases due to intestinal parasites :—					
Cestoda-(Taenia) ...	—	21	21	—	—
Nematoda (other than ankylostoma) :—					
Ascaris ...	—	89	89	1	1
Strongylus ...	—	4	4	—	—
Oxyuris ...	—	3	3	—	—
Unclassified .	—	1	1	—	—
117. Appendicitis ..	—	11	11	1	—
118. A. Hernia :—Femoral	1	1	2	—	—
Inguinal ...	1	48	49	—	5
Umbilical ...	—	2	2	—	—
Strangulated ...	—	1	1	1	—
B. Intestinal obstruction ...	—	1	1	1	—
119. A. Affections of the anus :—					
Fistula ...	2	4	6	—	1
Prolapse ...	2	1	3	—	—
B. Other affections of the intestines :—					
Constipation ..	—	56	56	—	2
Unclassified ...	—	1	1	1	—
122. Cirrhosis of the liver :—					
Alcoholic ...	—	1	1	—	—
Other forms ...	—	3	3	1	—
124. Other affections of the liver: —					
Hepatitis ...	1	3	4	2	—
Cholecystitis ...	—	1	1	1	—
Jaundice ...	1	7	8	1	—
126. Peritonitis (of unknown cause) ...	—	4	4	2	—
VII *Diseases of the Genito-urinary System* (*non-venereal*) :					
128. Acute nephritis ..	2	9	11	—	—
129. Chronic nephritis ...	—	1	1	1	—
130. B. Schistosomiasis ...	13	616	629	5	22
131. Other affections of the kidneys :—Pyelitis ...	—	5	5	—	2
Haematuria (non-Bilharzial) ...	—	10	10	—	1
Perinephritic abscess ...	1	—	1	—	—
132. Urinary calculus ...	—	3	3	—	—
Renal calculus ..	—	1	1	—	—
133. Diseases of the bladder :—Cystitis ...	—	21	21	1	—
Incontinence of urine	—	2	2	—	—
Retention of urine ...	—	3	3	—	—
Other diseases	—	1	1	—	—
134. Diseases of the urethra :—Stricture ..	—	1	1	—	—
Abscess ...	—	3	3	—	—
Papilloma ..	—	1	1	—	—
135. Diseases of the prostate :—					
Prostatitis ...	2	1	3	—	—
Carried forward	235	6,024	6,259	162	332

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1934	Admissions during 1935.	Total Cases Treated.	Deaths.	Remaining at the end of 1935
Brought forward	235	6,024	6,259	162	332
136. Diseases (non-Venereal) of the genital organs of Man:—Epididymitis	—	5	5	—	2
Orchitis	—	11	11	—	1
Hydrocele	2	52	54	—	5
Ulcer of penis	1	3	4	—	—
Phimosis	—	7	7	—	—
Para-phimosis	—	6	6	—	—
137. Cyst or other non-malignant tumours of the ovaries	—	4	4	—	1
138. Salpingitis	1	6	7	—	—
139. Uterine tumours (non-malignant)	—	3	3	—	—
140. Uterine haemorrhage (non-puerperal)	—	1	1	—	—
141. A. Metritis	—	3	3	—	—
B. Other affections of the female genital organs:					
Displacements of Uterus	—	2	2	—	—
Amenorrhoea	1	2	3	—	—
Dysmenorrhoea	—	2	2	—	—
Ovaritis	—	1	1	—	—
Menorrhagia	—	1	1	—	—
Prolapse	—	1	1	—	—
Vaginitis	—	2	2	—	—
Other diseases	—	3	3	1	—
142. Diseases of the Breast (non-puerperal):—					
Mastitis	1	9	10	—	—
Abscess of the breast	1	32	33	—	—
Other diseases	—	2	2	—	—
VIII. *Puerperal State*:					
143. A. Normal labour	—	33	33	—	2
B. Accidents of pregnancy:—					
Abortion	—	8	8	—	—
Ectopic gestation	—	1	1	—	—
Ante-partum haemorrhage	—	1	1	1	—
Other accidents of pregnancy	—	7	7	1	—
144. Puerperal haemorrhage	—	2	2	1	—
Retained placenta	—	8	8	1	—
145. Other accidents of parturition	—	40	40	9	—
146. Puerperal septicaemia	—	9	9	5	—
148. Puerperal eclampsia	—	1	1	1	—
149. Sequelae of labour	—	2	2	—	—
150. Puerperal affections of the breast	—	2	2	—	—
IX. *Affections of the Skin and Cellular Tissues*:					
151. Gangrene:—Cancrum oris	—	5	5	3	—
152. Boil	—	25	25	—	1
Carbuncle	1	10	11	—	—
153. Abscess	7	120	127	—	10
Whitlow	—	62	62	—	3
Cellulitis	9	141	150	—	6
154. A. Tinea	—	12	12	—	—
B. Scabies	23	469	492	—	26
154. Other diseases of the skin:—Urticaria	—	10	10	—	—
Eczema	3	72	75	—	2
Herpes	—	8	8	—	—
Psoriasis	—	6	6	—	—
Elephantiasis	2	15	17	—	—
Myiasis	—	1	1	—	—
Chiggers	1	47	48	—	—
Dermatitis	—	23	23	—	1
Acnes	—	1	1	—	—
Impetigo	—	74	74	—	2
Ulcer	43	665	708	5	62
Unclassified	—	14	14	—	—
Carried forward	331	8,076	8.407	190	456

TABLE Vb.—Continued.

Diseases	Remaining at the end of 1934	Admissions during 1935	Total Cases Treated	Deaths	Remaining at the end of 1935
Brought forward	331	8,076	8,407	190	456
X. *Diseases of Bones and Organs of Locomotion (other than Tuberculous)* :					
155. Diseases of the bones :—					
Osteitis	2	5	7	—	5
Periostitis ...	1	6	7	—	—
Osteomyelitis ..	1	26	27	—	—
Other diseases ..	—	3	3	—	—
156. Diseases of the joints :—					
Arthritis ...	1	13	14	—	1
Synovitis ...	1	44	45	—	—
158. Other diseases of bones or organs of locomotion :—					
Bursitis ...	—	3	3	—	—
Ganglion ...	—	7	7	—	—
Lumbago ...	1	26	27	—	1
Myalgia ...	5	103	108	—	2
Tenosynovitis ...	1	7	8	—	—
Unclassified ...	—	6	6	—	—
XI. *Malformations* :					
159. Hydrocephalus ...	—	2	2	—	—
Spina bifida ...	—	2	2	—	—
Polydactylism ...	—	1	1	—	—
Other malformations ...	—	1	1	—	—
XII. *Diseases of Infancy* :					
160. Congenital debility ...	—	2	2	—	—
162. Other affections of infancy ...	—	7	7	1	—
XIII. *Affections of Old Age* :					
164. Senility ...	—	7	7	—	—
Senile dementia ...	—	1	1	—	—
XIV. *Affections produced by External Causes* :					
165. Suicide (attempted) by poisoning ...	—	2	2	—	—
175. Food poisoning ...	—	3	3	—	—
176. Attacks of poisonous animals :—					
Snake-bite ..	3	21	24	—	—
Insect-bite ...	—	10	10	—	—
177. Other accidental poisonings ...	—	12	12	9	—
178. Burns (by fire) ...	16	197	213	21	8
179. Burns (other than by fire)	1	16	17	2	—
182. Drowning (accidental) ...	—	1	1	1	—
183. Wounds by firearms (war excepted)	—	7	7	1	1
184. Wounds (by cutting or stabbing instruments) ..	13	285	298	4	8
185. Wounds (by fall) ...	5	186	191	1	16
187. Wounds (by machinery) ...	—	10	10	—	—
188. Wounds (crushing, e.g., rail-accident, etc.) ...	—	11	11	2	—
189. Injuries inflicted by animals, (bites, kicks, etc.)	4	108	112	7	8
192. B. Hunger or thirst ...	—	2	2	—	—
194. Exposure to heat :—					
Heatstroke ...	—	1	1	—	—
Sunstroke ...	—	2	2	—	—
195. Lightning stroke ...	—	9	9	—	5
198. Murder (by cutting or stabbing instruments)...	—	2	2	2	—
199. Murder by other means ...	—	5	5	5	—
Carried forward	386	9,238	9,624	246	511

TABLE Vb.—Continued.

Diseases	Remaining at the end of 1934	Admissions during 1935	Total Ccases Treated	Deaths	Remaining at the end of 1935
Brought forward	386	9,238	9,624	246	511
201. A. Dislocation ...	—	24	24	—	1
Sprain	1	33	34	—	1
Fracture ...	15	108	123	7	10
202. Other external injuries :—					
Concussion ...	—	9	9	—	—
Bruises ...	4	68	72	1	2
Foreign body (except eye) ...	—	1	1	—	—
Abrasions ...	3	37	40	—	2
Unclassified ...	1	22	23	—	1
XV. *Ill-Defined Diseases :*					
205. A. Diseases not already specified or ill-defined :—					
Ascites ...	—	24	24	3	3
Oedema ...	—	11	11	—	—
Asthenia or debility ...	1	26	27	1	2
Headache ...	—	13	13	—	—
Pyrexia of uncertain origin ...	—	2	2	2	—
Diseases not diagnosed ...	1	6	7	—	—
B. Malingering ...	—	5	5	—	—
Malnutrition ...	1	1	2	—	—
C. Observation cases ...	—	11	11	—	4
TOTAL ...	413	9,639	10,052	260	537

TABLE VI.

Table VIa.—Return of Diseases (European Out-Patients) for the Year 1935.

Diseases.	M.	F.
I. *Epidemic, Endemic and Infectious Diseases*:		
1. Enteric group:—		
Type not defined	2	3
2. Typhus	1	—
3. Relapsing fever	2	—
5. Malaria:—		
Tertian (benign)	7	4
Quartan	4	3
Aestivo-autumnal	22	12
Cachexia	2	—
Blackwater fever	1	1
Type not defined	61	50
7. Measles	5	5
8. Scarlet fever	1	—
9. Whooping cough	—	1
10. Diphtheria	—	2
11. Influenza	23	18
16. Dysentery:—		
Amoebic	31	34
Bacillary	1	1
21. Erysipelas	—	1
25. Other epidemic diseases:—		
Rubeola	—	2
Varicella	4	8
30. Mycosis	1	—
31. Tuberculosis, pulmonary and laryngeal	1	4
36. Tuberculosis of other organs:—		
Genito-urinary systen	—	1
38. Syphilis:—		
Primary	1	—
Secondary	2	—
40A. Gonorrhoea and its complications	8	—
41. Septicaemia	1	—
Septic infection	2	1
42. Other infectious diseases:—		
Vaccination	8	7
II. *General Diseases not mentioned above*:		
46. Cancer or other malignant tumours of the female genital organs	—	1
48. Cancer or other malignant tumours of the skin	1	—
50. Tumours (non-malignant):—		
Adenoma	—	1
Cyst	2	1
Osteoma	1	—
Papilloma	2	—
Sebaceous cyst	2	1
51. Acute rheumatism	—	3
52. Chronic rheumatism	5	4
57. Diabetes (not including Insipidus)	1	—
58. Anaemia:—		
Pernicious	—	2
Other Anaemias	4	16
66. Alcoholism	3	—
69. Other general diseases:—		
Auto-intoxication	—	3
Purpura haemorrhagica	1	—
Acidosis	1	—
Obesity	—	1
III. *Affections of the Nervous System and Organs of the Senses*:		
70. Encephalitis (not including encephalitis lethargica)	1	—
Carried forward	215	191

Diseases	M.	F.
Brought forward	215	191
72. Locomotor ataxia	1	—
75. Paralysis	1	—
78. Epilepsy	—	1
79. Convulsions (non-puerperal) 5 years or over	—	1
82. Hysteria	—	2
Neuritis	6	1
Neurasthenia	11	12
Migraine	—	1
Neuralgia	2	3
Sciatica	4	1
84. Other affections of the nervous system	1	—
85. Diseases of the eye and annexa:—		
Blepharitis	1	—
Conjunctivitis	6	6
Foreign body	8	2
Glaucoma	—	1
Stye	2	2
Ulcer of cornea	—	1
Other diseases	10	1
86. Affections of the ear and mastoid sinus:—		
Otorrhoea	1	2
Otitis	10	4
Cerumen	8	3
Other diseases	23	13
IV. *Affections of the Circulatory System*:		
90. Other diseases of the heart:—		
Valvular-mitral	2	—
Myocarditis	4	1
Disordered action	1	4
91. Diseases of the arteries:—		
Arterio-sclerosis	9	5
92. Embolism or Thrombosis (non-cerebral)	1	—
93. Diseases of the veins:—		
Haemorrhoids	9	8
Varicose veins	1	—
94. Diseases of the lymphatic system:—		
Lymphadenitis (non-specific)	2	4
V. *Affections of the Respiratory System*:		
97. Diseases of the nasal passages:—		
Rhinitis	7	4
Coryza	34	13
Sinusitis	4	—
98. Affections of the larynx:—		
Laryngitis	8	3
99. Bronchitis:—		
Acute	25	22
Chronic	2	2
Bronchial catarrh	4	2
100. Broncho-pneumonia	—	1
101. Pneumonia:—		
Lobar	2	1
102. Pleurisy	—	1
105. Asthma	2	—
107. Other affections of the respiratory system:—		
Hay fever	—	1
Pleurodynia	—	1
Carried forward	427	321

TABLE VIa.—Continued.

Diseases.	M.	F.
Brought forward	427	321
VI. *Diseases of the Digestive System :*		
108 A. Diseases of the buccal cavity and annexa :—		
Alveolar abscess	4	2
Dental caries	14	14
Pyorrhoea	7	2
B. Stomatitis	1	5
109. Affections of the pharynx or tonsils :—		
Pharyngitis	2	5
Enlargement of tonsil	4	3
Tonsillitis	56	45
Other diseases	1	1
111 A. Ulcer of the stomach	2	—
B. Ulcer of the duodenum	4	—
112. Other affections of the stomach :—		
Gastritis	27	12
Dyspepsia	34	19
113. Diarrhoea and enteritis :—		
Under two years	8	7
114. Diarrhoea and enteritis :—		
Two years and over	31	19
Colic	1	1
Colitis	3	5
115. Ankylostomiasis	1	—
116. Diseases due to intestinal parasites :— Nematoda (other than ankylostoma).		
Ascaris	1	—
Oxyuris	1	—
117. Appendicitis	9	3
118. Hernia :		
Inguinal	1	—
Umbilical	1	—
119. A. Affections of the anus :—		
Fissure	—	2
B. Other affections of the intestines :—		
Constipation	8	3
124. Other affections of the liver :—		
Cholecystitis	3	2
Jaundice	1	—
Hypertrophy	1	—
VII. *Diseases of the Genito-urinary System (non-venereal) :*		
129. Chronic nephritis	1	—
130. Schistosomiasis	1	—
131. Other affections of the kidneys :—		
Pyelitis	5	9
Renal glycosuria	1	—
132. Urinary calculus	2	1
Renal calculus	1	2
133. Diseases of the bladder :—		
Cystitis	8	8
Incontinence of urine	1	—
Other diseases	—	1
134. Diseases of the urethra :—		
Stricture	1	—
136. Diseases (non-venereal) of the genital organs of man :—		
Epididymitis	4	—
Hydrocele	3	—
Ulcer of penis	1	—
Phimosis	8	—
Carried forward	690	492

Diseases	M.	F.
Brought forward	190	492
139. Uterine tumours (non-malignant):—		
Fibroid	—	1
141 A. Metritis	—	2
B. Other affections of the female genital organs :—		
Displacements of the uterus	—	3
Amenorrhoea	—	7
Dysmenorrhoea	—	4
Ovaritis	—	1
Menorrhagia	—	10
Vaginitis	—	1
142. Diseases of the breast (non-puerperal) :—		
Mastitis	—	2
VIII. *Puerperal State :*		
143. A. Normal labour	—	21
B. Accidents of pregnancy :—		
Abortion	—	1
Vomiting	—	6
Ante-partum haemorrhage	—	1
Other accidents	—	2
144. Retained placenta	—	1
145. Other accidents of parturition	—	3
150. Puerperal affections of the breast	—	1
IX. *Affections of the Skin and Cellular Tissues :*		
152. Boil	21	5
153. Abscess	15	4
Whitlow	1	—
Cellulitis	21	10
154. A. Tinea	2	—
B. Scabies	—	2
154. Other diseases of the skin :—		
Urticaria	4	3
Eczema	22	10
Herpes	1	2
Psoriasis	1	—
Prickly heat	3	1
Myiasis	3	—
Chiggers	5	—
Dermatitis	4	8
Impetigo	1	1
Ulcer	6	3
Unspecified	5	4
X. *Diseases of Bones and Organs of Locomotion (other than Tuberculous) :*		
155. Diseases of the bones :—		
Periostitis	3	—
156. Diseases of joints :—		
Synovitis	9	3
158 Other diseases of bones or organs of locomotion :—		
Bursitis	—	1
Lumbago	7	6
Myalgia	8	5
Tenosynovitis	1	—
Torticollis	2	1
Flatfoot	—	1
XI. *Malformations :*		
159. Other congenital malformations :—		
Cleft palate	—	1
Carried forward	835	630

TABLE VIa—Continued

Diseases	M.	F.
Brought forward	835	630
XII. *Diseases of Infancy*:		
160. Congenital debility	1	—
162. Other affections of infancy ...	4	—
XIV. *Affections produced by External Causes*:		
175. Food poisoning	2	4
176. Attacks of poisonous animals:— Insect-bite	5	3
177. Other accidental poisoning ...	1	—
178. Burns (by fire)	5	—
179. Burns (other than by fire) ...	3	1
183. Wounds by firearms (war excepted)	1	—
184. Wounds (by cutting or stabbing instruments)	6	2
185. Wounds (by fall) ...	5	—
187. Wounds (by machinery) ...	1	—
188. Wounds (crushing e.g., rail accident, etc.) ...	1	2
Carried forward	870	642
Brought forwad	870	642
189. Injuries inflicted by animals, (bites, kicks etc.) ...	25	9
201. A. Dislocation	4	3
B. Sprain	25	9
C. Fracture	9	1
202. Other external injuries:—		
Bruises	12	1
Abrasions ...	22	1
XV. *Ill-Defined diseases*:		
205 A. Diseases not already specified or ill-defined:—		
Oedema	—	1
Asthenia or debility ...	33	21
Headache	3	—
Diseases not diagnosed ...	—	1
B. Malingering	1	—
Total ...	1,004	689

TABLE VI.

Table VIb. Return of Diseases (Native Out-Patients) for the Year 1935. (Including Asiatics, Native Officials, K.A.R. Native Ranks, Native General Population, Asiatic and Native Convicts).

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
I. *Epidemic, Endemic and Infectious Diseases* :				
1. Enteric group :—				
Typhoid fever ...	2	—	—	—
Type not defined	1	—	—	—
3. Relapsing fever	123	18	10	2
5. Malaria—				
Tertian (benign)	159	79	—	—
Quartan	43	31	—	—
Aestivo-autumnal	648	338	—	—
Cachexia	44	28	—	—
Blackwater fever	2	1	—	—
Type not defined	2,358	1,470	5,947	4,060
6. Smallpox	—	—	2	—
Alastrim	—	2	—	—
7. Measles	114	45	468	443
9. Whooping cough	164	143	579	586
10. Diphtheria	1	—	—	—
11. Influenza	701	365	1,445	722
13. Mumps	4	—	—	—
15. Epidemic diarrhoea	11	12	—	—
16. Dysentery :—				
Amoebic	166	21	—	—
Bacillary	—	1	—	—
Undefined	116	83	1,091	792
20. Leprosy	88	18	18	7
21. Erysipelas	2	—	—	—
22. Acute poliomyelitis	2	1	—	—
24. Epidemic cerebro-spinal fever ...	1	—	—	—
25. Other epidemic diseases :—				
Rubeola	69	31	—	—
Varicella	71	14	—	—
Yaws	407	360	2,156	1,477
Trypanosomiasis	2	—	—	—
28. Hydrophobia	—	1	—	—
29. Tetanus	2	2	—	—
30. Mycosis	2	3	—	—
31. Tuberculosis, pulmonary and laryngeal ...	84	44	—	—
32. Tuberculosis of the meninges or central nervous system	2	—	—	—
33. Tuberculosis of the intestines or peritoneum	1	3	—	—
34. Tuberculosis of the vertebral column ...	18	4	—	—
35. Tuberculosis of bones and joints ...	10	2	—	—
36. Tuberculosis of other organs :—				
Skin ...	4	2	—	—
Lymphatic system	13	11	—	—
Genito-urinary system ...	4	—	—	—
Other organs	1	—	—	—
37. Tuberculosis—unclassified ...	—	—	15	19
38. Syphilis :—				
Primary	311	258	—	—
Secondary	342	304	—	—
Tertiary	60	62	—	—
Hereditary	55	38	—	—
Period undefined	46	32	389	264
39. Soft chancre	16	10	—	—
40. A. Gonorrhoea and its complications ...	522	205	198	71
B. Gonorrhoeal ophthalmia ...	12	6	—	—
C. ,, arthritis ..	7	1	—	—
41. Septicaemia .	4	—	—	—
42. Other infectious diseases:—				
Filariasis	7	1	—	—
Vaccination	51	28	—	—
Unclassified	—	—	78	89
Carried forward	6,873	4,078	12,396	8,532

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	6,873	4,078	12,396	8,532
II. *General Diseases not mentioned above* :				
43. Cancer or other malignant tumours of the buccal cavity	2	2	—	—
44. Cancer or other malignant tumours of the stomach or liver	3	—	—	—
46. Cancer or other malignant tumours of the female genital organs ...	—	2	—	—
47. Cancer or other malignant tumours of the breast	—	2	—	—
48. Cancer or other malignant tumours of the skin	1	10	—	—
49. Cancer or other malignant tumours of organs not specified	5	2	—	—
50. Tumours (non-malignant) :—				
Adenoma	14	21	—	—
Lipoma ...	10	6	—	—
Cyst ...	15	13	—	—
Dermoid cyst	1	1	—	—
Osteoma ...	2	2	—	—
Papilloma	3	—	—	—
Sebaceous cyst ...	8	2	—	—
Unspecified	12	2	53	40
51. Acute rheumatism	4	2	—	—
52. Chronic rheumatism	429	257	47	2
53. Scurvy	8	8	30	30
54. Pellagra	25	6	—	—
55. Beriberi ...	1	—	—	—
56. Rickets ...	4	1	—	—
58. Anaemia :—				
Other anaemias	34	9	10	7
60. Diseases of the thyroid gland :—				
Exophthalmic goitre ...	2	2	—	—
Other diseases of the thyroid gland ...	4	6	—	—
64. Diseases of the spleen :—				
Abscess	1	—	—	—
Rupture	—	1	—	—
Splenitis ...	17	5	—	—
Unclassified	4	—	3	4
65. Leukaemia ..	2	—	—	—
Hodgkin's disease ...	5	—	—	—
66. Alcoholism	3	—	—	—
69. Other general diseases :—				
Unclassified	—	—	102	75
III. *Affections of the Nervous System and Organs of the Senses* :				
70. Brain abscess	1	—	—	—
71. Meningitis (not including tuberculous or cerebro-spinal meningitis) ..	2	—	—	—
73. Other diseases of the spinal cord :—				
Myelitis ...	1	—	—	—
Spastic paraplegia	3	—	—	—
74. Apoplexy :—Haemorrhage	1	—	—	—
Thrombosis	1	—	—	—
75. Paralysis :—Hemiplegia ...	10	3	—	—
Other paralyses	22	4	—	—
77. Other forms of mental alienation :—				
Dementia	3	—	—	—
Melancholia	3	—	—	—
Mania	2	—	—	—
Idiocy	4	—	—	—
Delusional insanity ...	7	3	—	—
Other mental diseases ...	4	1	—	—
Carried forward	7,556	4,451	12,641	8,690

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward ...	7,556	4,451	12,641	8,690
78. Epilepsy ...	74	14	—	—
80. Infantile convulsions	1	1	—	—
82. Hysteria	—	2	—	—
Neuritis	11	9	—	—
Neurasthenia	10	2	—	—
Hemicrania	3	—	—	—
Intercostal neuralgia	6	1	—	—
Migraine	2	1	—	—
Neuralgia	127	53	—	—
Sciatica	21	4	—	—
Vertigo	2	—	—	—
84. Other affections of the nervous system :—				
Unclassified	—	—	313	217
85. Diseases of the eye and annexa :—				
Blepharitis	3	6	—	—
Cataract ...	49	9	—	—
Chalazion	1	—	—	—
Conjunctivitis ...	3,044	2,964	9,170	9,991
Trachoma	10	6	—	—
Foreign body	31	4	—	—
Glaucoma	4	1	—	—
Optic neuritis ...	1	1	—	—
Stye	14	8	—	—
Tumour ...	2	4	—	—
Ulcer of cornea	65	48	—	—
Other diseases ...	95	54	—	—
86. Affections of the ear and mastoid sinus :—				
Mastoiditis	5	4	—	—
Otorrhoea ...	558	369	—	—
Otitis	696	443	—	—
Cerumen	99	48	—	—
Unclassified ...	119	41	4,352	3,501
IV. *Affections of the Circulatory System :*				
87. Pericarditis	2	—	—	—
89. Angina pectoris	5	4	—	—
90. Other diseases of the heart :—				
Valvular	37	13	—	—
Myocarditis	18	9	—	—
Disordered action	13	3	21	11
92. Embolism or Thrombosis (non-cerebral) ...	1	2	—	—
93. Diseases of the veins :—				
Haemorrhoids	23	—	1	—
Varicose veins	7	—	—	—
Phlebitis	10	5	—	—
94. Diseases of the lymphatic system :—				
Lymphangitis ...	32	26	—	—
Lymphadenitis (non-specific) ...	53	17	—	—
95. Haemorrhage of undetermined cause :—				
Epistaxis	2	1	—	—
V. *Affections of the Respiratory System :*				
97. Diseses of the nasal passages :—				
Polypus	2	—	—	—
Rhinitis ...	10	—	—	—
Coryza	1,889	826	5,175	3,165
Sinusitis	1	—	—	—
98. Affections of the larynx :—				
Laryngitis	21	14	—	—
99. Bronchitis :—Acute	5,174	3,871 }	20,697	12,663
Chronic	1,716	100 }		
Carried forward	21,625	13,439	52,370	38,238

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries.	
	Males	Females	Males	Females
Brought forward	21,625	13,439	52,730	38,238
100. Broncho-pneumonia	90	46	—	—
101. Pneumonia—Lobar ...	84	35	—	—
Unclassified	6	2	678	573
102. Pleurisy :—				
Empyema	9	4	—	—
Other pleurisies	39	5	61	36
103. Congestion of the lungs ...	—	1	—	—
105. Asthma	162	35	252	129
107. Other affections of the respiratory system :—				
Pleurodynia	36	13	—	—
Abscess of lung	1	—	—	—
Unclassified	—	—	10	2
VI. *Diseases of the Digestive System :*				
108. A. Diseases of the buccal cavity and annexa :				
Dental caries	1,622	1,160	4,901	4,341
Alveolar abscess	37	17	—	—
Pyorrhoea	257	159	1,113	889
B. Stomatitis	223	150		
Glossitis	11	2	—	—
109. Affections of the pharynx or tonsils :—				
Pharyngitis	599	240	964	747
Tonsillitis	438	188		
Vincent's angina	—	1	—	—
Other diseases	94	26	—	—
111. A. Ulcer of the stomach ...	1	—	—	—
B. Ulcer of the duodenum ...	3	—	—	—
112. Other affections of the stomach :—				
Gastritis	75	24	2,834	1,444
Dyspepsia	666	328		
113. Diarrhoea and enteritis :—				
Under two years	575	400	5,947	3,995
114. Diarrhoea and enteritis :—				
Two years and over ..	688	321		
Colic	225	59	—	—
Colitis	139	55	—	—
Ulceration	1	—	—	—
115. Ankylostomiasis	2,715	1,222	2,114	1,674
116. Diseases due to intestinal parasites :—				
Cestoda—Taenia ...	30	12	—	—
Nematoda (other than ankylostoma):—				
Ascaris	437	240	—	—
Strongylus	21	6	—	—
Oxyuris	9	8	—	—
Unclassified ...	6	2	43	25
117. Appendicitis	10	1	—	—
118 A. Hernia :—Femoral	1	—	—	—
Inguinal	66	—	—	—
Umbilical	1	1	—	—
Strangulated	—	1	—	—
B. Intestinal obstruction ...	—	1	—	—
119. A. Affections of the anus :—				
Fistula	3	1	—	—
Fissure	2	—	—	—
Prolapse	2	—	—	—
Abscess	1	—	—	—
B. Other affections of the intestines :—				
Constipation	6,500	3,506	16,206	9,076
Unclassified	18	3	133	66
122. Cirrhosis of the liver :—				
Alcoholic	3	2	—	—
Other forms	2	1	—	—
Carried forward	37,533	21,717	87,626	61,235

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward	37,533	21,717	87,626	61,235
124. Other affections of the liver :—				
Hepatitis ...	4	—	—	—
Cholecystitis	1	—	—	—
Jaundice	6	5	—	—
126. Peritonitis (of unknown cause) ...	3	1	—	—
127. Other affections of the digestive system	1	2	—	—
VII. *Diseases of the Genito-urinary System (non-venereal)* :				
128. Acute nephritis	6	4	—	—
129. Chronic nephritis	1	1	—	—
130. B. Schistosomiasis	2,581	1,095	2,512	1,134
131. Other affections of the kidneys :—				
Pyelitis	3	3	—	—
Haematuria (non-Bilharzial) ...	77	16	—	—
132. Urinary calculus	3	—	—	—
Renal calculus	3	—	—	—
133. Diseases of the bladder :—Cystitis ...	40	15	1	2
Incontinence of urine	4	2	—	—
Retention of urine	3	—	—	—
Other diseases	1	—	—	—
134. Diseases of the urethra :—				
Stricture	3	—	—	—
Abscess ...	6	—	—	—
Papilloma	—	1	—	—
Urethritis	2	—	—	—
135. Diseases of the prostate—Hypertrophy ...	1	—	—	—
Prostatitis ...	1	—	—	—
136. Diseases (non-venereal) of the genital organs of man :—Epididymitis ...	15	—	—	—
Orchitis ...	25	—	—	—
Hydrocele ...	73	—	—	—
Ulcer of penis ...	5	—	—	—
Phimosis ...	24	—	—	—
Para-phimosis	7	—	—	—
137. Cyst or other non-malignant tumours of the ovaries	—	4	—	—
138. Salpingitis	—	8	—	—
139. Uterine tumours (non-malignant) ...	—	4	—	—
140. Uterine haemorrhage (non-puerperal) ...	—	2	—	—
141. A. Metritis	—	4	—	—
B. Other affections of the female genital organs :—				
Displacements of the uterus ...	—	3	—	—
Amenorrhoea	—	9	—	—
Dysmenorrhoea	—	9	—	—
Leucorrhoea	—	2	—	—
Ovaritis ...	—	3	—	—
Menorrhagia	—	7	—	—
Prolapse ..	—	1	—	—
Vaginitis	—	2	—	—
Other diseases	—	5	—	—
142. Diseases of the breast (non-puerperal) :—				
Mastitis	—	33	—	—
Abscess of breast	—	93	—	—
Other diseases	—	5	—	—
VIII. *Puerperal State* :				
143. A. Normal labour	—	37	—	4
Carried forward	40,432	23,093	90,139	62,375

TABLE VIb. Continued.

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
Brought forward	40,432	23,093	90,139	62,375
B. Accidents of pregnancy :—				
Abortion	—	10	—	22
Ectopic gestation ...	—	1	—	—
Vomiting	—	2	—	—
Ante-partum haemorrhage ...	—	2	—	—
Other accidents of pregnancy ..	—	12	—	—
144. Puerperal haemorrhage	—	2	—	—
Retained placenta	—	12	—	—
145. Other accidents of parturition ...	—	50	—	—
146. Puerperal septicaemia	—	11	—	—
148. Puerperal eclampsia	—	1	—	—
149. Sequelae of labour ...	—	3	—	—
150. Puerperal affections of the breast ...	—	2	—	—
IX. *Affections of the Skin and Cellular Tissues* :				
151. Cancrum oris	7	7	—	—
152. Boil	563	168	1,561	1,191
Carbuncle	25	14	—	—
153. Abscess	618	297	2,026	2,006
Whitlow	251	121	493	345
Cellulitis	427	113	111	77
154. A. Tinea	477	89	571	630
B. Scabies	13,609	5,857	18,970	12,942
155. Other diseases of the skin :—				
Urticaria	75	38	—	—
Eczema	1,350	973	—	—
Herpes	57	25	—	—
Psoriasis	93	80	—	—
Prickly heat	3	2	—	—
Elephantiasis	16	8	—	—
Myiasis	3	3	—	—
Chiggers	328	171	196	165
Dermatitis	259	161	—	—
Acne	6	2	—	—
Impetigo	1,048	557	—	—
Ulcer	5,274	2,565	21,655	14,351
Unclassified ...	84	39	6,334	5,458
X. *Diseases of Bones and Organs of Locomotion (other than Tuberculous)* :				
156. Diseases of the bones :—				
Osteitis	7	3	—	—
Periostitis	12	—	—	—
Osteomyelitis	22	8	—	—
Other diseases	3	—	—	—
157. Diseases of the joints :—				
Arthritis	18	10	—	—
Synovitis	116	34	142	58
Other diseases	2	—	—	—
158. Other diseases of bones or organs of locomotion :—				
Bursitis	7	3	—	—
Ganglion ...	9	7	—	—
Lumbago	497	139	8,137	4,982
Myalgia ...	1,998	775		
Tenosynovitis	30	8	—	—
Unclassified	17	—	—	—
Carried forward	67,743	35,478	150,335	104,602

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries Males	Rural Dispensaries Females
Brought forward ...	67,743	35,478	150,335	104,602
XI *Malformations*:				
159. Hydrocephalus	2	—	—	—
Imperforate anus	1	—	—	—
Polydactylism	2	1	—	—
Spina bifida	2	—	—	—
Other malformations	1	1	—	—
XII. *Diseases of Infancy*:				
160. Congenital debility ...	2	3	—	—
162. Other affections of infancy	6	2	—	—
163. Infant neglect	1	—	—	—
XIII. *Affections of Old Age*:				
164. Senility	212	17	—	—
Senile dementia	1	—	—	—
XIV. *Affections produced by External Causes*:				
165. Suicide (attempted) by poisoning ...	2	—	—	—
175. Food poisoning	23	13	—	—
176. Attacks of poisonous animals:—				
Snake-bite	37	13	—	—
Insect-bite	88	24	—	—
177. Other accidental poisonings ...	6	6	10	4
178. Burns (by fire)	762	530	3,792	3,164
179. Burns (other than by fire) ...	39	35		
180. Suffocation (accidental)	1	—	—	—
182. Drowning (accidental)	1	—	—	—
183. Wounds by firearms (war excepted) ...	7	1	—	—
184. Wounds (by cutting or stabbing instruments)	4,275	952	—	—
Circumcision-ritual	120	—	—	—
185. Wounds (by fall)	3,009	691	—	—
186. Wounds (in mines or quarries) ...	57	4	—	—
187. Wounds (by machinery) ...	20	—	—	—
188. Wounds (crushing e.g., rail accident, etc.)	22	5	—	—
189. Injuries inflicted by animals (bites, kicks, etc.)	368	131	987	723
192. A. Over-fatigue	1	—	—	—
B. Hunger or thirst	2	—	—	—
194. Exposure to heat:—				
Heatstroke	2	—	—	—
Sunstroke	2	—	—	—
195. Lightning stroke	7	2	—	—
196. Electric shock	1	—	—	—
198. Murder (by cutting or stabbing instruments)	2	1	—	—
199. Murder by other means ...	5	1	—	—
201. A. Dislocation	36	14	—	—
B. Sprain	222	35	—	—
C. Fracture	122	21	65	17
202. Other external injuries:—				
Concussion	13	2	—	—
Bruises	660	196	—	—
Foreign body (except eye) ...	99	48	—	—
Abrasions	1,416	276	—	—
Unclassified	756	195	30,314	10,676
Carried forward	80,156	38,698	185,503	119,186

TABLE VIb.—Continued

Diseases	Hospital Out-Patients		Rural Dispensarie	
	Males	Females	Males	Females
Brought forward ...	80,156	38,698	185,503	119,186
XV. *Ill-Defined Diseases*:				
205. A. Diseases not already specified or ill-defined :—				
Ascites	20	6	—	—
Oedema	24	1	—	—
Asthenia or debility	103	23	—	—
Headache	1,762	550	—	—
Pyrexia of uncertain origin ...	3	1	—	—
Diseases not diagnosed ...	44	27	—	—
Unclassified	—	—	7,177	3,598
B. Malingering	7	1	—	—
Malnutrition	1	—	—	—
C. Observation cases	13	2	—	—
TOTAL ...	82,133	39,309	192,680	122,784

AN ACCOUNT OF A MEDICAL SURVEY OF AN ISOLATED COMMUNITY.

BY

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I. INTRODUCTION.

CHILWA ISLAND was selected as the most suitable area for investigation when it was decided that a Medical Survey should be performed in the administrative district of Zomba during August, 1935, with the object of obtaining information and statistics relating to health and sanitary conditions prevailing in a locality devoid of medical facilities. This island, situated in a lake similarly named, is about 20 miles from Zomba ; it is of small extent—approximately 8 miles in circumference, this, and the fact that it is adequately populated influenced its selection.

Encircling the island—between the foothills and the water's edge, there is a strip of land—described on a geological map as "alluvium" which on the western side widens to form a plain approximately one mile square ; similar enlargements of this coastal belt occur also to the north-west and east. The interior consists of a series of steep hills of limestone formation rising 1500 feet above lake level. Except where outcrops of rock occur, the hillsides are covered with small trees and almost impenetrable scrub in which numerous large baobab trees stand out prominently.

The foreshore is thickly overgrown with reeds which extend for a considerable distance into the lake on three sides of the island ; on the western aspect, the reeds are less dense and between the mainland and the island there is a wide sheet of open water. Conditions are ideal for the development of mosquitoes and molluscs.

The native population—numbering about 700, is gathered together in ten small communities each of which consists of from 10 to 20 huts. These villages are to be found at the base of the foothills, close to enlargements of the coastal belt.

II. CONDITIONS AFFECTING THE HEALTH OF THE INHABITANTS

(a) *Sanitation.* Little or no attention is paid to sanitation and the simplest principles of hygiene are not understood. Hitherto latrines have not been used but work had commenced on two before the survey terminated. It is the custom for adults when relieving themselves, to seek the shelter of the scrub or reeds adjacent to the village, but, it was observed that the young children did not always demand such privacy. Contamination with animal excreta also occurs as sheep and goats are permitted to graze in and around the huts.

Domestic refuse is deposited out of doors to be consumed by the household animals. This method, or rather lack of method of disposal probably accounts for the prevalence of rats ; at every village complaints were made regarding their depredations.

(b) *Housing conditions.* The arrangement of huts is entirely haphazard in accordance with local custom. This arrangement is unsightly but it has the advantage of preventing the concentration of those nuisances which occur under primitive conditions. Both rectangular and circular, wattle and daub grass-roofed huts are constructed, the type erected being apparently a question of personal preference ; only a few huts are provided with windows for light and ventilation.

(c) *Water supplies.* There are no permanent streams or rivers on the island ; rain falling on the hills is immediately conducted to the lake. Supplies are obtained either from Lake Chilwa or from holes on the foreshore containing seepage water. When procured direct from the lake, a small area of foreshore is cleared of reeds to facilitate collection. Usually, there is an adjacent clearing used by women and children as a bathing pool though in some instances a single clearing served for all purposes. Adult males as a rule do not tend to foregather at one bathing place nor do they regularly use the same pool.

Water holes are constructed for the purpose of obtaining supplies during the dry season when the level of the lake falls and not with the object of purifying the fluid. Invariably, these holes contain a water of questionable colour and odour underneath a scum covered surface. In the absence of a cover and parapet, pollution is almost inevitable and cannot be avoided.

(d) *Food supplies and diet.* Gardens are not restricted to the coastal belt, many of the valleys in the interior of the island are cultivated. Soil appears to be of poor quality and crops are not abundant ; sweet potatoes, maize, groundnuts, beans and cassava are grown, considerable dependence being placed on the latter crop. Some villages have a few paw-paw, banana and mango trees growing in the vicinity.

Every village possesses its quota of sheep and goats, augumented in one locality by a small herd of cattle. None of these animals is ever deliberately killed for food nor is the milk used for human consumption.

Fish form an important item of the local dietary. Combined with the foodstuffs previously mentioned and green vegetables in the form of sweet potato leaves and a type of wild spinach, the diet appears to be adequate for all purposes. The possibility of a vitamin deficiency will be referred to subsequently.

There is a plentiful supply of fish and any caught in excess of local requirements are smoked or dried and sent to Zomba where they find a ready sale at the Native Market. The fishing industry is the financial mainstay of the inhabitants.

III. SCOPE AND METHOD OF CONDUCTING THE INVESTIGATION.

Medical investigations carried out under field conditions are naturally limited in scope. In the time available it was not possible to enquire into the question of the quantity of food consumed.

Nine villages were visited and during the the course of the survey 112 males and 108 females were examined. This represents about 30% of the estimated population of the island.

It must be remembered that the majority of these natives have had little or no contact with Europeans and few, if any, have had experience of European methods of treatment. A certain amount of propaganda work was therefore necessary as a preliminary to requests for specimens of urine and faeces. It was anticipated that some difficulties would be experienced in obtaining such material, actually the response was reasonably satisfactory. This may have been due to the arrangement made to exchange specimens for medicines when it was realised that there were many willing to avail themselves of this opportunity to obtain treatment.

As villages are no great great distance apart, it was decided to establish a central camp and from it outlying villages were visited. After the work of the day was completed, equipment was sent ahead to the next village on the list, thus avoiding delay in commencing operations the following morning.

The inhabitants of each village or group of villages were given twenty-four hours notice of my visit and instructed to prepare a roofless grass-walled enclosure 10 feet in diameter. This was used as a consulting room and laboratory, affording ample shelter and privacy.

Each person coming forward for examination had his or her name, age, sex and village entered in a record book. Questions were asked regarding past and present illnesses; the spleen was palpated for enlargement and a brief clinical examination made to determine the presence or absence of disease; all information obtained was recorded. Next, with blood from a finger prick, thick and thin films were prepared, and at the same time material was procured for a haemoglobin estimation by Tallquist's method. The individual was then given a cardboard box for the faecal specimen and if a male, a test tube for a sample of his urine, together with a prescription form on which was recorded his reference number and the treatment advised. A wide mouthed bottle—instead of a test tube, was given to female patients, otherwise the procedure was similar to that described. Treatment was withheld until specimens were delivered—in a few instances empty containers were returned surreptitiously.

Three sizes of boxes were used as containers for faecal specimens, the size issued being dependent upon the age-group of the recipient. All containers were numbered, but as many of these people are illiterate and 2, 3 or even 4 boxes were being issued to one family, it was considered that containers of different sizes would more readily assist in identification of ownership should the necessity arise.

Material for blood films was obtained from all without difficulty but there was some reluctance on the part of the older members of the community to produce the other specimens. In view of the native dread of witchcraft and the association—in the native mind—of that practice with excreta, the response cannot be regarded as unsatisfactory. From 51 young children in the first age-group, 11 urines and 15 stools were obtained, 106 in the second age-group i.e. over 2 years and under 10 years, returned 94 urines and 98 stools, while 53 urines and 53 faecal specimens were procured from 63 members of the third age-group. The number of specimens received from children aged 6 months to 2 years is admittedly low, but the difficulties in the way of obtaining them from the very young will no doubt be appreciated. At some villages there was a marked disproportion between the population recorded in the census book and the total examined. The respective headmen when questioned, admitted that a number of women and children had gone to work in the gardens to avoid being examined.

IV. EXAMINATION OF SPECIMENS AND TABULATION OF THE RESULTS.

Urines were centrifuged and the resulting deposits examined. Two simple smear preparations were made from each specimen of faeces and if ova were found in the first slide examined the other was rejected; when neither preparation contained ova the specimen was recorded as negative.

TABLE I.

		Total number of urines examined.			Total number of stools examined.		
Group No.	Age-Group	Male	Female	Group Total	Male	Female	Group Total
1	6 months to 2 years	5	6	11	7	8	15
2	Over 2 years and under 10 years ...	58	36	94	60	38	98
3	Over 10 years ...	24	29	53	22	31	53
	Grand Total			158			166

TABLE II.

URINES CONTAINING *S. haematobium* OVA, ARRANGED ACCORDING TO AGE-GROUP AND SEX.

Total positive 74=46.8%.

Group 1				Group 2				Group 3				Total			
Male		Female		Male		Female		Male		Female		Male		Female	
+	−	+	−	+	−	+	−	+	−	+	−	+	−	+	−
2	3	2	4	23	35	20	16	10	14	17	12	35	52	39	32
40%	...	33%	...	40%	...	55%	...	41%	...	58%	...	40%	...	55%	...

It will be observed that the percentage of females infested with *S. haematobium* in the second and third age-groups, is considerably higher than the percentage of males. Watson (1) during a medical survey of children attending Ntakataka Mission School on the shores of Lake Nyasa, found that similar conditions prevailed there. He believed this was due largely to the tendency on the part of the females to select—for privacy—a bathing place which unfortunately for them, also afforded conditions most suitable for the mollusc host. As customs regarding the selection of bathing places are identical in both localities, it is possible that this provides an explanation for the higher incidence of urinary and also rectal schistosomiasis which prevails in the female inhabitants of Chilwa Island.

It is improbable that females are naturally more susceptible than males to this infection and the true distribution of the disease will not be obtained until the results of surveys from different parts of the country are available.

Annual medical reports show a preponderance of male cases attending for practically every disease recorded, but this cannot be regarded as a correct indication of the distribution of disease in the country according to sex, as, females avail themselves less readily of the medical facilities available.

TABLE III.

STOOL EXAMINATION ARRANGED ACCORDING TO AGE-GROUP AND SEX.

	Group 1		Group 2		Group 3		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
No. containing ova of ascaris	2	3	13	11	4	6	19	20
No. containing ova of hookworm	1	0	7	2	5	11	13	13
No. containing ova of ascaris and hookworm	0	0	1	0	0	0	1	0
No. containing ova of *S. mansoni*	0	0	3	8	1	1	4	9
No. containing *E. coli* cysts	0	0	3	2	0	1	3	3
No. containing strongyloides larvae	0	0	1	0	0	0	1	0
No. negative	4	5	32	15	12	12	48	32
Total	7	8	60	38	22	31	89	77

Percentage of males positive for either ascaris, hookworm or *S. mansoni*=41.5
,, ,, females ,, ,, ,, ,, ,, ,, *S. mansoni*=54.5
,, ,, males positive for hookworm ... ... =15.7
,, ,, females ,, ,, ,, ... =16.8

Twenty-nine out of 148 individuals from whom specimens of both urine and faeces were obtained had infections of the urinary and digestive systems. The sex distribution and helminthic combinations were as follows: —

Males.		*Females.*	
S. haematobium and ascaris ova	8.	*S. haematobium* and ascaris ova	5.
		S. haematobium and hookworm ova	7.
S. haematobium and hookworm ova	4.	*S. haematobium* and *S. mansoni* ova	5.
	12		17

The complete absence of permanent streams associated with the sandy nature of the soil must, by rendering conditions unfavourable for the larvae, account to a considerable extent for the low degree of hookworm infection. Ascaris eggs are more resistant to exposure, and dissemination of infection is facilitated by conditions which hasten desiccation and dispersion of excreta containing ova.

It is regretted that meteorological observations are not available.

HAEMOGLIOBIN PERCENTAGES DETERMINED BY TALLQUIST'S SCALE ARRANGED ACCORDING TO AGE-GROUP AND SEX.

TABLE IV.

Hb%	Group 1		Group 2		Group 3		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
85	0	0	0	0	1	0	1	0
80	0	0	3	5	6	0	9	5
75	0	1	7	5	4	8	11	14
70	4	3	28	21	9	18	41	42
65	5	7	12	4	2	8	19	19
60	7	12	11	7	2	3	20	22
55	4	3	1	0	1	0	6	3
50	1	3	2	0	1	0	4	3
40	1	0	0	0	0	0	1	0
Group total	22	29	64	42	26	37	112	108
Average percentage	60.6	64.6	67.5	69.6	71.1	69	67	67.2
Average age-group percentage	61		68.3		70		67.1	

Although Tallquist's method of determining the haemoglobin percentage is lacking in accuracy, it is nevertheless useful for field work, enabling data to be obtained—sufficiently reliable for the purpose of comparison.

The debilitating effect of hyperendemic malaria is evident by the low average percentage of haemoglobin recorded for the first and second age-groups, although in neither group is it possible to estimate to what extent helminthic infections are contributing factors.

The following figures, obtained from the Kenya Medical Report for 1933, in a reference to to the prevalence of anaemia among the Wadigo, show that an equally low average percentage of haemoglobin occurs there.

Year	Adult Males	Adult Females	Children	Babies
1932	76%	72%	64%	43%
1933	73%	68%	62%	51%

TABLE V.

The results of palpation of the spleen are expressed according to crude measurements by finger breadths in accordance with the following classificaton :—

Spleen not palpable	O
Spleen palpable	P
Spleen enlarged one finger's breadth	1
Spleen enlarged two fingers' breadth	2
Spleen enlarged three fingers' breadth	3
Spleen enlarged four fingers' breadth	4
Spleen enlarged a hand's breadth	H
Spleen reaching umbilicus	U

Age-group	O	P	1	2	3	4	H	U	Number enlarged	Number examined	Spleen rate.
6 months—2 years	0	4	4	20	12	4	1	5	51	51	100%
Over 2 years—under 10 years	7	36	16	35	10	0	2	0	99	106	93.4%
Total	7	40	20	55	23	4	3	5	150	157	

The spleen rate is defined as the number of persons (under 10 years) with palpable spleens in the total number (under 10 years) examined, expressed as a rate per cent; in the combined age-groups it is 95.5%. The possibility of schistosomiasis influencing these figures must be remembered as, 55.7% of 105 urines obtained from these two age-groups contained ova of *S. haematobium*.

RESULT OF EXAMINATION OF BLOOD FILMS.

I am indebted to the Pathologist, Zomba, for examining and reporting on the blood films collected during the course of the survey. In his report he states that "parasites were found only after a prolonged search in the majority of the positive films, in one slide only were they seen in comparatively large numbers."

Parasite counts were not obtained. Christophers (2) regards as almost valueless, examinations which record nothing as to the number of parasites present. It is not my intention to present this report as a complete malarial survey, the examinations were not undertaken with that end in view.

The following tables when examined in conjunction with Table V. (Splenic enlargement) indicate that Chilwa Island is a hyperendemic area.

TABLE VI.

SUMMARY OF BLOOD FILM EXAMINATIONS.

(Arranged as a rate percent. positive of the number examined)

Age-group	Number examined	Number positive	Percentage positive
6 months to 2 years	51	44	86.2
Over 2 and under 10 years	106	65	61.3
Over 10 years	63	11	17.4
	220	120	54.5

TABLE VII.

	First age-group No. positive 44	Second age-group No. positive 65	Third age-group No. positive 11
P. falciparum	27	49	8
P. vivax	6	—	—
P. malariae	5	11	1
P. falciparum and *P. malariæ*	4	1	—
P. falciparum and *P. vivax*	2	—	2
Type undefined	—	4	—

Of the 109 positive blood films obtained from members of the first and second age-groups, 83 (76%) contained *P. falciparum.* Thomson (3) during the months of March and April in the Fort Johnston district found a parasite rate of 50% of which, 85% were *P. falciparum.*

Gametocytes were present in 12 (11%) of the 109 positive films. Crescents and benign tertian gametocytes were scanty, being detected in less than 2% of the positive films; quartan gametocytes were present in 7.4%. The latter figure is very similar to that recorded by Thomson during the investigation referred to above.

INCIDENCE OF THE DIFFERENT SPECIES OF PARASITES IN THE THREE AGE-GROUPS.

TABLE VIII.

Age-Group	Number examined	(1) No. positive (2) Percentage positive	Asexual parasites				Sexual parasites		
			P.f.	P.v.	P.m.	X.	P.f.	P.v.	P.m.
6 months to	51	1	33	8	9	—	1	2	2
2 years	...	2	64.7	15.6	17.4	—	1.96	3.92	3.92
Over 2 and under	106	1	50	—	12	4	1	—	6
10 years	...	2	47.1	—	11.3	3.7	0.9	—	5.65
Over 10	63	1	10	2	1	—	—	—	—
years	...	2	17.4	3.5	1.7	—	—	—	—

X = parasites, type undefined.

FREQUENCY OF THE VARIOUS COMBINATIONS OF PARASITES.

TABLE IX.

P. f.	P.v.	P. m.	P. f. and P. m.	P. f. and P. v.	Undefined
84	6	17	5	4	4
70%	5%	14%	4.16%	3.33%	4.33%

CLINICAL EXAMINATION.

The physique of those examined was up to the average standard with the exception of four children, two of whom aged 5 years were found to be suffering from acute malaria.

The following diseases were observed or complained of during 220 clinical examinations.

	No. of cases.		No. of cases.
Otitis	3	Blindness (one eye)	2
Muscular rheumatism	10	Eczema	6
Dyspepsia	6	Dental caries	35
Constipation	5	Asthma	2
Pyorrhoea	2	Bronchitis	4
Epilepsy	3	Umbilical hernia	15
Impetigo	1	Ulcer	1
Blepharitis	1	Deafness	1
Scabies	20	Deformed thorax	1
Cystitis (Bilharzial)	8	Acute malaria	2

These conditions are common to every hospital and dispensary throughout the country; the low incidence of ulcer is difficult to account for, as no facilities are available for treatment of minor injuries. Umbilical hernia, though frequently found in children is rarely present in adults. generally spontaneous obliteration of the sac occurs before puberty. Fourteen of the children in whom this defect was found were less than 5 years old, the fifteenth, was aged between 10 and 11 years.

An unusual type of deformity of the thorax was seen. The body of the sternum and xiphoid process were deeply depressed backwards, producing a hollow in the sternal region as high as the articulation of the body with the manubrium. Gray's Anatomy applies the term "funnel-breast" to this deformity and states that it occurs in rickety children or adults and also in others who give no history or further evidence ot having had rickets. The parents of the case now reported were unable to state definitely if the condition was present at birth but they recollected noticing it when the child was a few months old, at a time when it was still being breast-fed. The child now aged about 5 years—is in no way embarrased by the deformity.

Thirty-five children of the second age-group had one or more teeth showing signs of caries; three was the maximum number of teeth involved in any one case. These children do not suffer from lack of sunlight but their diet does not contain many sources of vitamin D. The native infant is given cereal products in the form of maize gruel from a very early age; not only do cereal products lack vitamin D, they are stated (4) to be capable of inhibiting the action of the vitamin D which may be present in other portions of a diet.

In the absence of definite information regarding the vitamin D content of native diets and additional statistics on the prevalence of dental caries, it would be premature to attribute these cases of dental decay to vitamin D deficiency.

The number of cases complaining of bilharzial cystitis represents a very small proportion of the number of urines found containing ova of *S. haematobium* during the routine examinations. The disease is not recognised in its early stage and although many of the specimens of urine were coloured with blood, only eight cases complained of this condition.

Schistosomiasis ranks next to malaria in the list of debilitating diseases these people have to contend with and for both diseases treatment alone is not sufficient, re-infection must be prevented.

It must not be forgotten that we are dealing with an island people, dependent upon the resources of the surrounding lake for a livelihood and accustomed from an early age to swimming in its waters. The adult fisherman does not run much risk of infection while following his occupation of line fishing from a canoe in open water; it is the children, paddling and swimming close to the shore who need protection and they are most difficult to control.

Treatment, education, and propaganda unless accompanied by financial and technical aid will not accomplish much. Until alternative facilities in the form of uninfected bathing places and protected wells are available, contaminated water from Lake Chilwa must be used and schistosomiasis will continue to be a menace to the health of these people.

Although a vaccinator visits the island from time to time, 67 or 30 per cent. of those examined were unvaccinated and of these, 22 were found at one village. All age-groups were represented and it would appear that the activities of the vaccinator are not appreciated at this particular village. The remaining 45 were distributed throughout eight villages, many of them being under two years of age. The visit of a vaccinator is over-due.

PROPAGANDA.

At every assembly of villagers, the "Gospel of Prevention" was preached. Some of the more intelligent members of the community were shown ova of helminths under the microscope and had the life history described to them. Talks were given on (a) water-borne diseases and their prevention, (b) the necessity for latrines and a system of refuse disposal (c) fly-borne diseases (d) anti-rat measures and the construction of rat-proof grain stores.

It was stated that many young children died of "fever". Though figures could not be produced to substantiate this statement, it presented an opportunity to introduce the question of the preparation of a register of births and deaths and the Native Authority agreed to be responsible for the collection of the returns.

RECOMMENDATIONS.

The construction of a well or bore hole, with concrete bathing platforms in the vicinity for males and females, at the village of Principal Headman Mkumbira, in order to discourage the use of lake water for domestic purposes. This village is suggested, not because it belongs to the Native Authority but on account of the fact that there the incidence of *S. haematobium* reaches 70 per cent., considerably higher than elsewhere on the island. When the benefits of a pure water supplies are realised, it is to be anticipated that demands will be made for similar facilities at other villages.

2. A request was made for a dispenser and dispensary. It was pointed out that many of the prevalent diseases are preventable and owing to the small population it would not be an economic proposition to provide a permanent dispensary on the island, but, that it might be possible to send a dispenser there temporarily if accommodation were provided for him.

It is recommended that a well trained member of the native staff should be stationed on the island for short periods, at intervals of two or three months. The man selected should posesss a practical knowledge of hygiene and sanitation ; he must be capable of giving intravenous injections for schistosomiasis.

3. It is recommended that other departments should be invited to co-operate ; the problems are not all medical. Efforts might be made to improve the quantity and quality of crops or to extend the variety of foodstuffs by introducing lemon and lime trees, tomatoes and other vegetables.

4. It is not proposed to make suggestions regarding the control of malaria. Lake Chilwa extends over a large area and anti-larval measures even though restricted to the vicinity of the island, would entail considerable recurrent expenditure which the result would not justify.

REFERENCES.

(1) *Annual Medical Report of Nyasaland Protectorate*, Zomba, Nyasaland, 1934, pp. 23-24.

(2) Christophers, S. R., Sinton, J. A., and Covell, G., *How to do a Malaria Survey.* Government of India Publication. Calcutta p. 92.

(3) Thomson, J. G., *Malaria in Nyasaland. Proc. Roy. Soc. Med.*, 1934.

(4) *The Influence of Diet on Caries in Children's Teeth.* British Medical Research Council Report 1931.

A REPORT ON THE USE OF DEEP PITS FOR NIGHT SOIL DISPOSAL, JUNE 1935.

In a previous Report, the use of deep pits fitted with fly trap covers was referred to as a means of disposal of night soil. At that time, the pits had been in use for about three months only. The method is now reviewed following a longer period of trial.

As septic tanks were installed and brought into use at European residences, the quantities of night soil from such sources suffered a corresponding reduction, until, in some areas, the contents of buckets from public latrines for natives provided the only material requiring disposal. In spite of the excreta being covered with earth, and the replacement of lids by attendants, when persons using the latrines failed to do so, flies continued to hatch out and develop in great numbers in the pits. On occasions, traps with capacity of 480 cub. ins. were found to be full of adult flies while the pit contents was a seething mass of larvae.

Observation made at one pit revealed that larvae were capable of ascending the sides for a distance of twelve feet until they arrived at the poles supporting the pit top, then boring laterally into the soil they pupated outside the area covered by the cement top and subsequently emerged successfully. This practice was combated by removing the soil around the periphery of the pit to a depth of 12 ins. and replacing it by a murram, which, when moistered and tamped, set almost as firmly as cement. In another pit, erosion of the sides just above the level of the contents was so extensive as the result of the enormous numbers of larvae effecting an entrance into the walls—that the lower portion of the pit collapsed.

Although the situation with regard to the prevalence of flies was much improved, it was decided to attack the larvae in the pits, as egg laying in the latrine buckets could not be completely prevented.

The next attempt at eradication was made with a 5 per cent. solution of a coal tar disinfectant, half a gallon being sprayed daily into the pits: this had no appreciable effect on the activities of the larvae and resulted in the use of large amounts of disinfectant. An arsenical preparation much advocated for the destruction of cattle ticks was then tried in one series of pits. One gallon of a 5 per cent. solution weekly, though much more effective, did not entirely prohibit the development of larvae. At the same time the effect of 1 gallon of 12 per cent. solution of sodium arsenite weekly was being observed in other pits. This was most effective in its action on the larvae, killing them almost immediately but regular spraying at weekly intervals was found necessary to cope with larvae development from eggs laid in night soil in the buckets and deposited in the pits subsequent to a previous treatment. Having found an efficient solution, simple to use and also inexpensive, the weekly treatment of all pits was standardised.

The deep pit system was first introduced as an alternative to disposal by burial, the latter method having been found unsatisfactory as it took place in the immediate vicinity of houses; collection and disposal in a trenching ground being impracticable owing to the large area covered by the widely scattered houses comprising the Township of Zomba.

It was fully realised that filling of pits would occur, as owing to the fact that disinfectant and earth were added liberally to latrine buckets for the purpose of preventing ovipositing, liquifaction of excreta could not be effected. Although the pits are sited within the Township many of them within 100 yards of residences of Europeans, no complaints have been received of the creation of nuisances.

The sole objection to the use of arsenite of soda, so far as I can observe is the highly poisonous nature of the solution which may not be entrusted to the care of natives.

PARA-DICHLORIDE OF BENZINE.

Initial experiments with para-dicloride of benzine have given the following results. (Used in latrine pits).

PIT A. 1 lb. para-di. benzine sprinkled.

20/12/35.	New pit. No fly larvae.
23/12/35.	No fly larvae. 14 flies.
25/12/35.	No fly larvae. 100 (approx.) flies.
27/12/35.	No fly larvae. 100 (approx.) flies.
2/1/36.	Slight larval movement in several places.
12/1/36.	Much larval movement in 4 patches.

NOTE.—Faeces were mixed with much dry material and the mass in the pit was not fluid.

PIT B. 2 lb. para-dichloride of benzine.

20/12/35. Old pit. Much larval movement. Many flies.
2/12/35. No larval movement. Few flies.
28/12/35. No larval movement. 100 (approx.) flies.
30/12/35. Many larvae. Many flies.

NOTE.—Faeces were mixed with much dry matter.

PIT C. (Old pit previously treated with arsenite of soda). 1 lb. para-dichloride of benzine sprinkled.

20/12/35. No flies.
22/12/35. Few flies. No larval movement.
28/12/35. More flies. Many larvae present.
A wet pit. Liquified faeces.

ARSENITE OF SODA.

PIT D. 2 oz. arsenite soda dissolved in 2 gallons of water.

20/12/35. Many larvae. Many flies.
22/12/35. No larval movement. Few flies.
25/12/35. No larval movement. Few flies.
27/12/35. No larval movement. Few flies.
30/12/35. Slight larval movement. few flies.
4/12/35. Much larval movement.
Wet pit.

PIT E. 4 oz. arsenite dissolved in 2 gallons water.

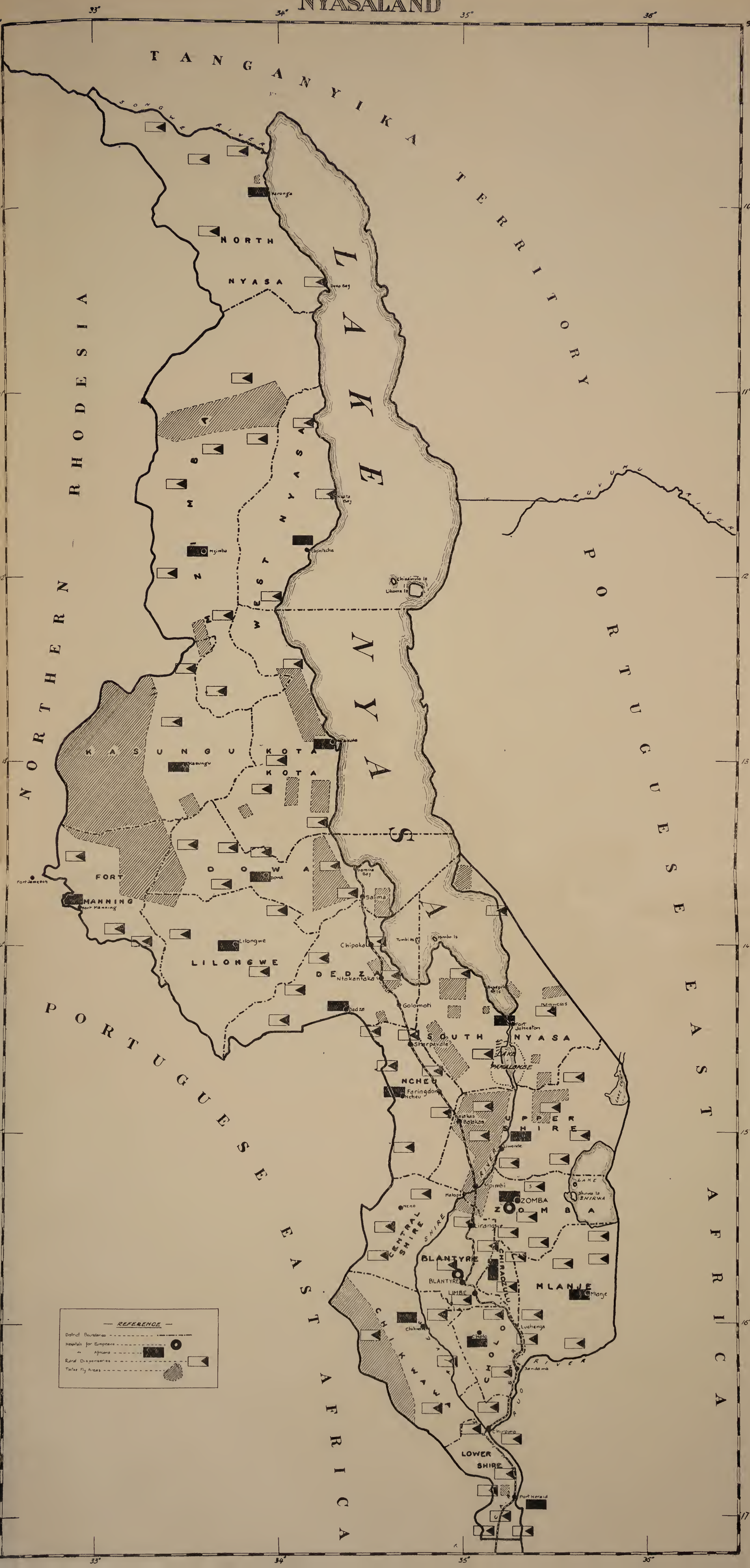
20/12/35. Many larvae. Result similar to above.
Wet pit.

PIT F. Received similar treatment to PIT E.

20/12/35. Many larvae. Many flies.
22/12/35. No larval movement. Few flies.
27/12/35. Slight larval movement in patches. More flies.
30/12/35. Much larval movement. More flies.
Dry pit.

F. L. CHAPMAN.
Sanitary Superintendent.

NYASALAND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TANGANYIKA TERRITORY
SONGWE RIVER
Karonga
NORTH NYASA
Deep Bay
LAKE NYASA
NORTHERN RHODESIA
PORTUGUESE EAST AFRICA
RUVUMA RIVER
MOMBERA
Mzimba
WEST NYASA
Nkata Bay
Chinteche
Chisamulo Is
Likoma Is
KASUNGU
Kasungu
KOTA KOTA
Kota Kota
FORT MANNING
Fort Manning
Fort Jameson
DOWA
Dowa
Domira Bay
Salima
LILONGWE
Lilongwe
Chipoka
Tumbi Is
Mumbo Is
DEDZA
Ntakataka
Dedza
Golomoti
SOUTH NYASA
Fort Johnston
Makanjiras
Sharpevale
LAKE PAMALOMBE
NCHEU
Faringdon
Ncheu
Balaka
UPPER SHIRE
Liwonde
LAKE CHIUTA
Mpimbi
Matope
Neno
ZOMBA
Zomba
LAKE SHIRWA
Shirwa Is
CENTRAL SHIRE
SHIRE RIVER
Lirangwe
BLANTYRE
Blantyre
Limbe
CHIRADZULU
MLANJE
Mlanje
Chikwawa
Cholo
CHIKWAWA
CHOLO
Luchenza
RUO RIVER
Sandama
Chiromo
LOWER SHIRE
Port Herald
REFERENCE
District Boundaries
Hospitals for Europeans
do Africans
Rural Dispensaries
Tsetse Fly Areas